

PROFESSIONAL PAPER 367 / November 1982

# SOVIET TACTICS FOR WARFARE AT SEA

Two Decades of Upheaval

Charles C. Petersen



CENTER FOR NAVAL ANALYSES

**APPROVED FOR PUBLIC RELEASE;  
DISTRIBUTION UNLIMITED**

**The ideas expressed in this paper are those of the author.  
The paper does not necessarily represent the views of either  
the Center for Naval Analyses or the Department of Defense.**

PROFESSIONAL PAPER 367 / November 1982

# **SOVIET TACTICS FOR WARFARE AT SEA**

Two Decades of Upheaval

Charles C. Petersen



*Naval Studies Group*

**CENTER FOR NAVAL ANALYSES**

2000 North Beauregard Street, Alexandria, Virginia 22311

## TABLE OF CONTENTS

	<u>Page</u>
Introduction .....	1
Sources and Methods .....	2
Levels of Discourse.....	3
Authoritativeness of Sources .....	6
The Great Tactical Debate, 1961-1964 .....	8
Massed Action .....	10
Combined Action .....	11
Emergence of a Consensus .....	14
The Consensus .....	18
Resurrection of the "Outdated Ideas" .....	21
Forms of Tactical Warfare .....	24
Causes of the Volte-Face .....	26
Reassessment of Enemy Defenses .....	26
Reassessment of Soviet Capabilities .....	27
Increased Tactical Importance of Conventional Weapons .....	29
How it May All Fit Together .....	31
Notes .....	34
Soviet Sources Cited.....	47

## SOVIET TACTICS FOR WARFARE AT SEA: TWO DECADES OF UPHEAVAL

### INTRODUCTION

Major innovations have changed the shape of Soviet military doctrine over the past decade. Their effects on the Soviet Navy's strategic employment concepts and on its "operational art"\* have been discussed at length in the West for several years now.<sup>3</sup> That the Soviet Navy's views on the tactical aspects of warfare at sea have also undergone major changes, however, is much less well appreciated--despite the development of new tactical scenarios and force employment principles by Soviet naval theorists, despite the existence of a large body of Soviet writings dealing with these changes, and, finally, despite the profound impact they have had on contemporary Soviet warship design. As a result, the emergence in recent years of several new classes of warships from Soviet yards has produced a good deal of puzzlement among our naval *cognoscenti* over why these new designs are so different from the old ones. Why, for example, do the Oscar class SSGN and the Kirov CGN both

---

\* The *Soviet Military Encyclopedia* defines "operational art" as "the component of the military art that encompasses the theory and practice of preparing and executing combined and independent operations...by large formations [*ob"edineniya*--e.g., an army, flotilla, *eskadra*, etc.] of branches of the armed forces. The operational art occupies an intermediate position between strategy...and tactics."<sup>1</sup> Thus, in Soviet military usage, the term has a much more specific meaning than it has in ours. While Soviet officers would be comfortable with designators such as "Operation Overlord" and "Operation Sea Lion," they would almost certainly object to the U.S. Navy's using the term "operations area" to denote a place where tactical evolutions are taking place.<sup>2</sup>

carry so many more missiles than their generational predecessors?<sup>4</sup> Why is the latter the first cruiser since the early 1960s to carry surface-to-surface missiles? It is difficult to place any of these weapons platforms on an evolutionary continuum of Soviet warship design because of the many sharp departures they reflect. We must look elsewhere if we are to explain their significance; many of the answers to these questions can be found in Soviet writings on naval tactical theory.

This paper will focus primarily on the development of Soviet views on anti-surface warfare (ASUW). The period with which this analysis deals begins in the early 1960s, when Soviet theorists first began to weigh the implications of their Navy's acquisition of nuclear-missile weapons on its tactics. Only a thorough understanding of the issues raised in this debate will enable us to assess the meaning and import of Soviet tactical writings today.

#### SOURCES AND METHODS

Before we begin our analysis, a few words about these writings should be said.

### *Levels of Discourse*

Soviet literature on naval theory contains three levels of discourse. At one level, Soviet theorists discuss the basic "forms" that warfare at sea can assume in a future global conflict. In any given historical era, say these theorists, the forms of warfare remain relatively constant, although their "content" may change (and new ones may appear on the scene). The "engagement" (*boy*), for example, has persisted as a form of tactical warfare since ancient times, while the methods by which it is fought--its "content"--have been completely transformed.<sup>5</sup> In practice, however, these forms themselves are far from immutable--in the sense that Soviet definitions of them may change, as may Soviet assessments of how likely they are to occur in the "next" war. This is especially true for Soviet naval tactics, where the "naval engagement" (*morskoy boy*) in particular has evolved at the hands of theorists in significant, and revealing, ways over the past 20 years.

At another, slightly less rarefied, level these theorists discuss "principles of the art of naval warfare." These principles derive, *mutatis mutandis*, from those applying to the military art as a whole and may have a strategic, operational, or tactical embodiment ("surprise," for example, may be strategic, operational, or tactical, depending on the scale of its application and the scope of its effect on the enemy<sup>6</sup>). Although they are said to reflect "the objectively existing

laws of warfare," their purpose is normative, that is, they "are followed when a war, operation, or engagement is prepared and conducted." Like the forms and methods of warfare, they, too, may change: "some lose their importance; others...gain new content; and new [ones]...come into being."<sup>7</sup> In naval tactics, two such principles--*massirovanie* or "massed action" and *vzaimodeystvie* or "combined action"--are of special interest here for that very reason, and this analysis will devote considerable attention to their development for the insights they provide into the present state of Soviet naval tactical thought.\*

It is only at the "lowest" level of discourse that we find the Soviets writing about tactics in a way that will seem familiar to the Western reader, that is, in terms of specific means, methods, or maneuvers for achieving specific tactical objectives. This type of treatment, however, tends to be less straightforward than we might expect: Some of them will parade as descriptions of "foreign" naval

---

\* For reasons this author does not fully understand, these principles, along with a host of others, were at one time often called "categories of the art of naval warfare." The term "categories" originated with Aristotle, who used it to denote the ten types of logical predicates that a subject may carry. In modern times, it refers to the basic premises of some metaphysical systems,<sup>8</sup> including Marx's "materialist dialectic," whence it was borrowed by Soviet military pedagogues to denote "the basic, fundamental concepts [of military science], reflecting the general, essential properties of war...and warfare."<sup>9</sup> Why normative military principles achieved the ranking of "categories" in the minds of Soviet military theorists cannot be determined, but we may assume from the *Soviet Military Encyclopedia's* separate definitions of "principles of the military art" and "categories of military science" that the two terms are no longer considered synonymous.<sup>10</sup>



tactics (which they may or may not really be) and others as efforts to draw lessons (which are not always made explicit) from World War II or the "Great Patriotic War." In each case, a judgment must be made as to the "real" meaning or purpose of the discussion in question. Fortunately, some rules of thumb do seem to apply here, at least where professional military journals, which provide the bulk of the source material for this paper, are concerned; for almost invariably they are divided into sections whose headings offer an important clue to the *raison d'etre* of the articles arranged in them. If an essay entitled "Some Trends in the Development of Naval Tactics" appears in *Morskoy sbornik's* section on "The Art of Naval Warfare"--the journal's principal theoretical section--we may safely assume that, for all its references to "the opinions of foreign specialists," it accurately reflects Soviet (or at least the author's own) views on the subject.<sup>11</sup> On the other hand, if an article on anti-ship missile defense (ASMD) appears in the "Foreign Navies" section of the journal, there is a better-than-even chance that its allusions to U.S. or NATO views are designed to be taken at face value.<sup>12</sup> This does not mean, however, that no insight into Soviet views can be gleaned from articles in that section, for Soviet writers often allow their own or official prejudices to creep into their assessments of the "probable enemy." Vice-Admiral Stalbo's now-famous articles on aircraft carriers in World War II<sup>13</sup> and in the postwar period<sup>14</sup> illustrate the point. U.S. military doctrine, avers Stalbo, has assigned to carriers a "significant role in the protection of

strategic missile submarines and in warfare against enemy missile submarines."<sup>15</sup> This, of course, is palpable nonsense and makes sense only if we take it to represent Soviet views, or at the very least Stalbo's own.

#### *Authoritativeness of Sources*

When assessing the writings of Soviet military theorists--whatever their level of discourse--we must also make judgments about their authoritativeness. When do they reflect "the system of views adopted by the state...on the goals and character of a possible war, on readying the nation and armed forces to wage it, as well as on the methods of waging it"?--that is, when do they reflect Soviet military doctrine?<sup>16</sup> When, conversely, do they represent the individual views of a given author?

Many monographs bear the stamp of official sanction on their title pages. The *Officer's Handbook*<sup>17</sup> and the third edition of *Military Strategy*,<sup>18</sup> published as part of the "Officer's Library" series of the Soviet Defense Ministry's Military Publishing House, belong in this group.<sup>19</sup> So do books whose title pages carry captions such as "textbook for higher naval colleges."<sup>20</sup>

Some publications contain--or are associated with--what James McConnell has called "doctrinal authenticators": telltale characterizations indicating that the views set forth in them also conform to Soviet military doctrine.<sup>21</sup> Reviews of Admiral Gorshkov's series of articles on "Navies in War and Peace" state that they had armed the Navy's officers with a "scientifically substantiated system of views on the development of navies and on their role and place in warfare."<sup>22</sup> As McConnell argues--and the *Soviet Military Encyclopedia* confirms--Soviet military doctrine defines itself as a "scientifically substantiated system of views."<sup>23</sup>

Soviet military doctrine, of course, does not pretend to have answers for every conceivable problem; nor by the same token do all Soviet military writings claim to be authoritative. That there is room for differences of opinion on some issues is plain from several instances of give-and-take between authors and readers in *Morskoy sbornik* alone during the past few years.<sup>24</sup> And, as we will see below, there is much to be learned about the development of Soviet tactical thought from such debates.

The vast majority of Soviet military writings, however, cannot be pigeonholed this easily. But we need not despair of being able to assess their authoritativeness: if a given formulation or argument appears time and again, unchanged and undisowned, we may with some

confidence presume it to reflect the party line of the moment. If several writers assert, for example, that command of the sea is "unthinkable" or "impossible" (or words to that effect) without command of the air,<sup>25</sup> mere happenstance will scarcely serve as an explanation for the observable uniformity. Nor is it likely, if no one deems it necessary to take issue with them, that all these writers are speaking out of turn.

Soviet professional military journals--chiefly *Morskoy sbornik* and *Voennaya mysl'*, organs, respectively, of the Navy and the General Staff--were the principal sources for this analysis. A number of Soviet monographs aimed at a military readership were also consulted, as was the *Soviet Military Encyclopedia*.\*

#### THE GREAT TACTICAL DEBATE, 1961-1964

The Soviet Union exploded its first fission bomb in 1949, its first thermonuclear device four years later, and by the middle 1950s had developed missiles for their delivery. The "revolution in military affairs" that these achievements heralded was slow in developing, for "some military theorists still thought that nuclear weapons could not change the basic principles of warfare and would not bring any serious qualitative changes to existing methods of warfare."<sup>26</sup> But by 1959 "all

---

\* For a complete list of sources cited in this paper, see pp. 62 ff.

the top brains of the General Staff" agreed that Soviet military doctrine needed revising and that nuclear-missile weapons must dictate the shape of future Soviet military strategy.<sup>27</sup> Shortly thereafter, according to the testimony of Colonel-General N. Lomov, a debate began on "the character of a possible world war, the methods of warfare should nuclear-missile weapons be employed, the missions of the Armed Forces as a whole and of their individual services and force arms..., the further improvement of [its] organization and equipment..., etc."<sup>28</sup>

And in January 1961, Rear-Admiral K.A. Stalbo fired the opening broadside of a debate on naval tactics sponsored by *Morskoy sbornik*. "One of the important tasks of contemporary military theory," he began,

"...is to develop new methods of fighting engagements [boi]...when nuclear-missile weapons are used.... As weapons and military equipment develop, the forms of warfare at sea also continually change. It is natural that...some force employment concepts and principles should change along with them.... Some concepts and principles die off and are replaced by new ones, and others change only in importance. But the old views and notions [about them] are proving very tenacious, which without doubt is hampering the development of [our] theory and the improvement of practice.

That is why an examination of various categories [principles] of the art of naval warfare as manifested today is advisable.<sup>29</sup>

Boldly, Stalbo proceeded to question the relevance in the nuclear-missile era of two of the most deeply-ingrained principles of Soviet naval tactics: the principle of "massed action" (*massirovanie*), which called for the concentration or "massing" of forces when engaging an

enemy; and the principle of "combined action" (*vzaimodeystvie raznorodnykh sil*), according to which that enemy could be defeated only by the combined, closely-coordinated efforts of units from several naval force arms, acting thus to compensate for their individual weaknesses and at the same time to enhance their overall effectiveness. These principles had matured during World War II, when the Soviet Navy was compelled to fight an ocean-going enemy navy with forces that could not operate beyond offshore waters.

#### *Massed Action*

This principle, argued Stalbo, belonged to the age of shells and torpedoes, whose lethal force was "relatively small" and probability of hitting the target "negligible."<sup>30</sup> What was more, this was an age--World War II--when defenses were more than a match for offensive capabilities.<sup>31</sup> Thus, only a "large mass" of forces could defeat an enemy and then only by "repeatedly" firing on him.<sup>32</sup>

But today, according to Stalbo, the situation had "sharply changed." The "great destructive force" of modern weapons had eliminated the need to fire again and again at the enemy in a naval engagement. One nuclear-tipped torpedo or missile could "in some conditions destroy not one major ship, but several such ships and their screening forces."<sup>33</sup> Moreover, the hit probability of the new weapons had "increased considerably"; under "certain circumstances, it now

approaches unity." Finally, missiles could be fired from stand-off ranges; missile-armed aircraft, for example, could fire at surface targets "while remaining beyond reach of [their] most formidable opponents...surface-to-air missiles"--and the gap between the ranges of antiship and antiaircraft missiles was likely to grow "even larger" than that in the years to come.<sup>34</sup> In view of this, it was no longer necessary to reckon on large losses of weapon platforms when determining the size of a force needed to perform a given combat mission.<sup>35</sup> For all these reasons, concluded Stalbo, "the concentration of a large number of platforms in a modern naval engagement--their massing--is ceasing to be a basic principle of naval force employment." Today, an assigned task could be performed "with a single powerful shot (*moshchnoe razovoe vozdeystvie*) against the enemy...with a relatively limited number of weapon platforms."<sup>36</sup>

#### *Combined Action*

This, Stalbo argued, was also a principle better suited to bygone days, when a mixture of platform types, mutual fire support, and concentration of forces were needed to perform tactical missions; combined action was "not just important, but essential" and "inevitably" entailed "large expenditures of time."<sup>37</sup>



Given the enormous lethality of nuclear-missile weapons, however, "the problem of seizing the initiative and of decisively defeating the enemy before he fires his own weapons" was "especially acute," for "losing the opportunity to be the first to open fire will frequently mean also losing the engagement."<sup>38</sup>

Nor was the need to strike at once the only factor that "frequently" ruled out the possibility of combined action. The range and power of nuclear missiles demanded the use of formations so spread out that launch platforms would have to operate "beyond visual and electronic reach of each other," posing "extraordinarily great technical difficulties" for command and control of a coordinated effort.<sup>39</sup>

Yet the same properties of nuclear-missile weapons that made combined action impossible also made it unnecessary. The modern means of warfare, claimed Stalbo, "free the attacker's striking groups from being completely dependent on each other," enabling "a homogeneous force to carry out an attack independently." The capabilities of submarines and aircraft--the "core of the strike forces of the [superpower]... navies"--were "altogether incommensurable" with those of surface ships or of "the forces and means for combatting missiles." Thus, "the creation of mixed groups to fight an engagement at sea has ceased to be the sole possible way of performing combat missions."<sup>40</sup> From all this, Stalbo concluded that combined action was "ceasing to be essential to the execution of combat missions."<sup>41</sup>



Stalbo's assault on these once unquestioned principles provoked a controversy whose like has rarely been aired on the pages of *Morskoy sbornik*, then or since. An intervention by the journal's editors later that year failed to quell the argument, and it resurfaced the next, its scope expanded and its vigor undiminished.<sup>42</sup> Because of their importance in the subsequent development of Soviet tactical thought, the arguments advanced by Stalbo's opponents ought to be summarized.

In challenging the notion that massed action could no longer serve as a basic principle of naval tactics, these opponents argued in three main directions. Some warned that the new weapons, formidable though they now were, would eventually and inevitably be countered. "Any new weapon seems to some degree 'absolute' as long as the means for fighting against it are not developed," wrote one critic, insisting that none could remain "absolute" indefinitely.<sup>43</sup> Others claimed that there were ways of defending against nuclear-missile weapons already: "The depth of antiaircraft and antisubmarine defenses...has greatly increased, in view of which attacking aircraft and submarines will be subjected to counterattacks at distances considerably greater than in the World-War-II period."<sup>44</sup> Still others, though conceding that modern launch platforms could stand off from their targets, argued that the missiles themselves were vulnerable to enemy fire: "even a salvo of missiles if too small may fail to reach the target, since all of them may be

destroyed or shot down" by surface-to-air missiles. While this did not require that *forces* be massed, it did require that *weapons* be massed;<sup>45</sup> the principle therefore lived on, although admittedly its "content" had changed.<sup>46</sup>

A similar cacophony of objections greeted Stalbo's demotion of combined action. "It allows the strengths of some forces to compensate for the weaknesses of others," which "enables them overall to perform a combat mission more completely and reliably [and] with fewer...losses," said one critic.<sup>47</sup> "The employment of mixed forces as well as of forces with different weapons and combat equipment allows the strengths of some forces to make up for the weaknesses of others," said another.<sup>48</sup> It was therefore "wrong to cast doubt on the advisability...of combined action," concluded a third.<sup>49</sup> And a fourth, while agreeing "on the whole" with Stalbo on this issue, argued that "one must not completely reject the need for mutual fire support."<sup>50</sup>

#### *Emergence of a Consensus*

(U) For all the uproar that Stalbo's article provoked, however, the conservatives were fighting a losing battle, even though Admiral Gorshkov himself proffered his backing.<sup>51</sup> For one thing, the views it expressed found a considerable measure of support.<sup>52</sup> More important, they accorded well with the Soviet military leadership's push to "rework the theory of the military art" and "reeducate [Armed Forces] personnel,

especially officers and generals."<sup>53</sup> And finally, many of Stalbo's key assumptions and arguments his opponents either acknowledged or left unchallenged.

Only one of them dared question that the principal means of tactical warfare would now be nuclear missiles;<sup>54</sup> none disputed the enormous lethality of these weapons (some even conceded their present superiority over defensive systems);<sup>55</sup> and no one challenged the assertion that they were so accurate their probability of hitting a target "under certain circumstances...now approaches unity."<sup>56</sup> All these were central premises in Stalbo's contention that "the need to concentrate [weapon] platforms...to perform an assigned mission has now passed."<sup>57</sup>

The critics found it even more difficult to refute Stalbo's position on combined action. Even as they insisted that it remained "the *sine qua non* of successful performance of a combat mission,"<sup>58</sup> they did not deny that it posed extraordinarily difficult and time-consuming command and control problems<sup>59</sup> at a time when preemptive action was essential. (As one of them put it: "The threat of large losses from nuclear weapons makes preempting the enemy's strikes and minimizing the time used to perform an assigned mission an especially critical problem.")<sup>60</sup>

Thus, by early 1964, when *Morskoy skornik's* editors interceded for the second and final time to wrap up the debate, Stalbo's views had made considerable headway, and had been taken in directions that even Stalbo had not foreseen.

On the question of combined action, the editors found his arguments persuasive. "On the ocean expanses at long distances from home bases," they wrote, "it is quite difficult to organize combined action between force arms such as...submarines and aircraft."<sup>61</sup> Given that "to delay in striking at an enemy grouping" was "fraught with grave consequences," it was "advisable to strike...immediately, as soon as weapon range allows."<sup>62</sup> If plans for a combined air-submarine strike stood in the way of meeting this requirement, they must be abandoned; for if the submarines put off firing their missiles while awaiting the arrival of the aircraft (or vice versa), the enemy would be able "either to evade their [attempted combined] strike, or defeat them as they concentrate [together], or both...."<sup>63</sup> Consequently, "combined action between groups from different force arms in forward areas must not be considered in all cases the *sine qua non* of organizing combat."<sup>64</sup>

Moreover, with his assertion that enemy forces could now be destroyed preemptively from standoff ranges,<sup>65</sup> Stalbo set the stage for an assault on yet another theoretical sacred cow: that the naval

engagement was "the only way to [tactical] victory."<sup>66</sup> For as participants began to point out later in the debate, if by "engagement" one meant "an organized bilateral struggle," an action where no exchange of fire took place could scarcely be called by that name.<sup>67</sup>

The editors of *Morskoy sbornik* also agreed with this notion. "Before the arrival of long-range weapons," they reasoned, "an attacker was forced to close with the target...while under enemy fire." In those days the engagement was "the main, and in point of fact, the only" form of naval warfare. But now that nuclear-missile weapons were "in widespread use," tactical assignments could be carried out "with one or a few salvos, often even without the attacker entering the enemy's zone of defense." Today, the enemy could be **"defeated and even crushed by means of a nuclear-missile strike"**--an action **"by no means unfailingly associated with a prolonged exchange of fire...."** The "new essence" of the strike as "one of the basic forms of warfare" was "sweeping aside" the old view that the enemy could be beaten only by engaging him. Although the engagement remained an "important" form of naval warfare, it was "most likely" only when conventional weapons were being used.<sup>68</sup>

It was only on the principle of massed action that the editorial board disagreed with Stalbo: Like him, they believed that the launch platforms of the day were much less vulnerable to enemy defenses, but they could not say the same for the missiles they carried. A single

cruise missile, they argued, could be shot down "comparatively easily," and so could an entire salvo if its size did not exceed "a certain minimum." This entailed a need to "mass forces and fire"--even if nuclear weapons were used--in order to "increase the assurance that the missiles will reach the target when there is strong opposition from enemy defenses."<sup>69</sup>

#### THE CONSENSUS

But by the eve of the Twenty-third Soviet Communist Party Congress, even *this* had changed, capping the debate with a total victory for the views of Stalbo and his supporters. "The main concern...in warfare at sea," wrote Admiral N.M. Kharlamov in January 1966, "is today coming to be not the massing of forces with a view to attaining the largest possible number of direct bomb, shell, or torpedo hits on enemy ships, but the organization of a small number of nuclear-missile strikes by comparatively small groups and even by single [launch] platforms."<sup>70</sup> "The notion of 'massed use of forces' has gained new content," wrote Admiral Yu. A. Panteleev a month later. "Now, there is no need to concentrate a large number of surface ships, submarines, and aircraft in a limited area.... [The] power of a [strike]...is determined not by the number of missiles fired, but by the power of the warheads."<sup>71</sup>

As table 1 shows, these two authors all but paraphrased each other--and Stalbo--on everything else that had been at issue during the debate, and coincided at critical junctures with judgments delivered in the authoritative third edition of Sokolovskiy's Military Strategy.<sup>72</sup> This congruence, together with the stature of the authors,<sup>73</sup> bespeaks the authoritative character of their formulations.

By the time the Soviet Navy completed its review of postwar tactical theory, therefore, it had found the principles and notions lying at the theory's very core to be significantly less relevant in the nuclear-missile era of warfare. The spectacular power, reach, and accuracy of the new weapons had put in doubt not only the need to concentrate a variety of platforms to fight the enemy, but also the advisability and even feasibility of attempting a combined effort against him in an age when immediate action had become imperative. Victory would belong not to the side that massed its forces or strove for the synergism of a carefully coordinate strike, but to the side that struck first with whatever forces were at hand. Preemption, indeed, was the key not only to victory, but to survival itself. In the past, as Panteleev put it, the first salvo--though of "great importance"--was "almost never decisive"; but today it meant "'to be or not to be'; for from a failed first salvo, one must expect an answering enemy strike with a decisive result."<sup>74</sup> Thus, when Kharlamov wrote that "naval



TABLE 1

## SHAPE OF THE CONSENSUS

	K.A. Stalbo (1961)	N.M. Kharlamov (1966)	Yu.A. Panteleev (1966)	V.D. Sokolovskiy (1968)
I. Combined action				
A. Importance of tactical preemption	<p>When weapons of mass destruction are in use...the problem of seizing the initiative and of decisively defeating the enemy before he fires his own weapons becomes especially acute.... [Today] the critical importance of the fight for the first salvo reaches its culmination, since losing the opportunity to be the first to open fire will frequently mean also losing the engagement.... The need to fire immediately on the enemy not only hampers, but frequently also rules out the possibility of organizing combined action, especially...in areas far removed from home bases.... [22-23]</p>	<p>In a nuclear-missile war he who is the first to strike will prevail. Therefore, a ship with tens of missiles with nuclear warheads aboard will present a threat only so long as it itself is not exposed to a nuclear strike.... [Today] the belligerents will strive to employ their striking forces...before they are subjected to enemy action. [34-35]</p>	<p>In the past...gunnery [officers] fought "for the first salvo," as it was of great importance in a naval engagement, although the first hit on the enemy...was almost never decisive.</p> <p>But...[today] "the first salvo" has acquired a new quality, as the very first nuclear-tipped missile hit in the target area can totally annihilate it. Now "the first salvo" [means] "to be or not to be," for from a failed "first salvo" one must expect an answering enemy strike with a decisive result. [28]</p>	<p>[Does not mention combined action.]</p>

(continued)



TABLE 1 (Cont'd)

	K.A. Stalbo (1961)	N.M. Kharlamov (1966)	Yu.A. Panteleev (1966)	V.D. Sokolovskiy (1968)
B. Possibility of/need for independent action	<p>The modern means of warfare free the attacker's striking groups from being completely dependent on each other. What is more, [these means] enable a homogeneous force to carry out an attack independently.... The core of the striking forces of the [superpower] navies...has become submarines and aircraft, ...whose combat capabilities are altogether incommensurable with the capabilities of surface ships or of the forces and means for combating missiles.... Therefore, the creation of mixed groups to fight an engagement at sea has ceased to be the sole possible way of performing combat missions. [21-22]</p> <p>[N]uclear-missile weapons bring...to the forefront the need to strike at the enemy as soon as possible after detecting him.... Simultaneously the need arises to perform a combat mission in a single powerful shot against the enemy with those forces closest to him and in a higher state of readiness for action. [21]</p>	<p>[E]arlier the forces detailed to perform a given mission had to coordinate their actions among themselves fairly scrupulously.... [N]ow, such scrupulousness is not compulsory. The reason is that previously the lethal effects of weapons were comparatively modest and decisive results could be achieved only through the combined efforts of many [weapons] platforms. But the firepower of modern naval forces has grown many times over.... [34]</p>	<p>To achieve the best results in combat at sea in the past, combined action of surface, sub-surface, and air forces was organized. Combined tactical action...is always desirable, although in our day not always compulsory or possible. Powerful nuclear-missile weapons now allow the execution of missions by a small, homogeneous force independently. Therefore, the concentration of a large mixed force is sometimes simply unnecessary and sometimes practically impossible....</p> <p>[Today] a more vital force employment principle is: "...no one waits for anyone" [nikto nikogo ne zhdet], for time today is very costly, and if there is an opportunity to strike at the enemy, one must not fail to seize it immediately, without waiting for the arrival of [help from] one's neighbor. [29]</p>	

(continued)

TABLE 1 (Cont'd)

II. Massed Action

A. Lethality of nuclear-missile weapons

K.A. Stalbo (1961)	N.M. Kharlamov (1966)	Yu.A. Panteleev (1966)	V.D. Sokolovskiy (1968)
A successfully employed nuclear-tipped torpedo or missile can in some conditions destroy not one major ship, but several such ships and their screening forces. [19]		Nuclear missile means of warfare make it possible with one strike to destroy not one ship, but several at once.... [28]	Earlier in order to destroy a major surface ship, the concentration of several submarines was required for a massed torpedo strike. Now, any surface ship can be destroyed with one nuclear-tipped torpedo or missile. [365]

B. Massing of forces

[The] concentration of a large number of platforms in a modern naval engagement--their massing--is ceasing to be a basic principle of naval force employment. [20] [A table shown on the same page presents numbers purporting to show that a combat assignment for which 340 aircraft carrying gravity ordnance were formerly needed can now be performed by only 10 aircraft carrying missiles with nuclear or high explosive warheads!]	In order to effect...[a nuclear missile] strike, there is no need whatsoever to move large forces...[and] concentrate them in the combat area.... Any feasible [enemy] ship grouping can now be destroyed in short order by comparatively small groups of platforms for long-range nuclear missile weapons.... [34]	The notion of "massed use of forces" has gained new content. Now, there is no need to concentrate a large number of surface ships, submarines, and aircraft in a limited area. [28]	The employment of nuclear weapons will not require detailing a large quantity of aircraft [or submarines] to perform...the task [of crushing an aircraft carrier task force or group]. [365]
--	---	---	--

(continued)

TABLE 1 (Cont'd)

C. Massed employment of weapons	K.A. Stalbo (1961)	N.M. Kharlamov (1966)	Yu.A. Panteleev (1966)	V.D. Sokolovskiy (1968)
III. Possibility of Engagements	<p>[A]ircraft armed with missiles...can deliver strikes against surface targets while remaining beyond reach of [their] most formidable opponents: ...surface-to-air missiles.... Submarines employing long-range homing weapons have also to a considerable degree been freed from the need to engage the forces screening the objective being attacked before delivering a strike against it.</p>	<p>[The] main concern...in warfare at sea is today coming to be not the massing of forces with a view of attaining the largest possible number of direct bomb, shell, or torpedo hits on enemy ships, but the organization of a small number of nuclear-missile strikes by comparatively small groups [of forces] and even by single [launch] platforms. [34]</p>	<p>[The] power of a [strike]... is determined not by the number of missiles fired, but by the power [i.e., megatonnage or kilotonnage] of the warheads. [29]</p>	<p>The availability in our Navy of missile submarines and missile-armed aircraft permits them to approach within missile-launch range of an aircraft carrier without entering the antiaircraft or air defense zones of the attack aircraft carrier task force. [364]</p>
A. Stand-off capability of modern weapons				

(continued)

TABLE 1 (Cont'd)

B. Likelihood of engagements	K.A. Stalbo (1961)	N.M. Kharlamov (1966)	Yu.A. Panteleev (1966)	V.D. Sokolovskiy (1968)
	<p>[N]aval engagements as previously understood... have become a thing of the past. They have been replaced by powerful, momentary and highly productive strikes executed by highly maneuverable groupings of platforms for nuclear missiles and [nuclear] torpedoes. [34]</p>	<p>Not long ago the partial objective of an operation could be achieved only by means of an engagement, and an operational result was the consequence of engagements that, aggregated together, made up an operation, and a strategic objective was achieved by conducting a series of operations.... [But] if earlier the destruction of a strategic enemy target was associated with the execution of one or several relatively prolonged operations and a large number of engagements, their components, now such a mission can be performed with one nuclear-missile strike. Thus, the engagement has ceased to be the one and only means of achieving a partial operational or strategic objective. [28]</p>		

engagements as previously understood...have become a thing of the past," <sup>75</sup> he really meant that they must not be allowed to take place at all, for engaging the enemy presupposed exchanging strikes with him, and an exchange of fire would inevitably prove fatal.

Thus was Soviet naval theory "freed," as Admiral Gorshkov wrote a year later, "from manifestly outdated ideas," and the "gap between the combat capabilities of [nuclear-missile] weapons and the tactics for their employment" eliminated.<sup>76</sup>

Although the new tactical doctrine did not take *formal* effect until shortly before the Twenty-third Party Congress in the spring of 1966, at least some of its elements appear to have been implemented informally several years earlier. In April 1963, for example, one of the participants in the debate proposed that the Soviet Navy abolish its traditional distinction between "force arm tactics" on the one hand and "general naval tactics," or the tactics of combined action, on the other.<sup>77</sup> The term "general tactics," he wrote, ought to be "abandoned altogether," since "in real life the theory and practice of waging combat both independently as well as jointly with other force arms are developed and refined by the tactics of each force arm"; that is, **"the basic principles of the combined employment of naval forces are dictated not by one or another principle of general tactics, but by the tactics**

of whatever force arm is the main one when performing a given concrete task."<sup>78</sup> This suggests that as early as 1963 the importance of combined action had sharply diminished--while that of independent action had risen--in the Soviet Navy's everyday tactical practice.

#### RESURRECTION OF THE "OUTDATED IDEAS"

But the formal consensus lasted only a few short years, barely surviving the close of the decade and giving way in the early 1970s to a revival of the same "outdated ideas" the Soviet Navy had fought for so long to repudiate.

The first hints that a theoretical *volte-face* was underway--or had already occurred--appeared in mid-1971, when the author of an article on Soviet naval theory on the eve of the "Great Patriotic War" observed that the Navy's 1937 *Combat Manual* had "recommended that [tactical] missions be performed by the principle of combined action and massed action for...the fullest exploitation of the firepower and mobility of the forces participating in an engagement."<sup>79</sup> Seven months later, an article on "trends in the development of naval forces" stated that "the methods of operational-tactical employment of naval forces in warfare at sea are changing," pointing to the "increasingly noticeable determination abroad to employ them jointly in a tactically coordinated way [*v takticheskoy vzaimodeystvii*]."<sup>80</sup> And in mid-1972 Admiral Gorshkov wrote

that "the First World War clearly showed that combined action of forces and means had become the *sine qua non* of warfare at sea."<sup>81</sup> By 1974, however, the Soviets no longer found it necessary to defend this *volte-face* with allusions to ostensible historical or "foreign" practice.

#### *Combined Action*

"In the military and naval art," began an article in early 1974 entitled "Combined Action--A Paramount Principle of Force Employment," "there are a number of fundamental, cardinal questions associated with the theory and practice of warfare. One of these is the combined action of forces taking part in an operation or engagement."<sup>82</sup> At the tactical level, wrote the author, combined action "is designed to eliminate mutual interference" between units deploying, maneuvering, and firing their main weapons, "as well as to intensify pressure [*vozdeystvie*] on the enemy" such that "the results of this pressure are greater than the sum of strikes (attacks) made by individual ships, aircraft, and groups participating in an engagement." Combined action, if "correctly" organized, "enables a mixed force to attack the enemy...from different directions with a variety of means and hampers his evasion of strikes." Thus, the enemy "sustains maximum damage and the attackers a minimum of losses."<sup>83</sup> In short, "combined action of all forces plays a *decisive* role in the modern naval engagement,"<sup>84</sup> and "is one of the basic principles of waging combat in modern conditions," without which "not one of the missions of the armed struggle can be executed."<sup>85</sup>



A host of theorists have echoed these thoughts since then, including Admiral Gorshkov: "Combined action...is one of the most important categories [sic] of the art of naval warfare," he wrote in both editions of *Sea Power of the State*. "A rational combination of the offensive and defensive capabilities of mixed groups enables the execution of tasks which considerably exceed in scale those executed with the aggregated capabilities of homogeneous forces.... The importance of tactical and operational combined action is growing in the navy's execution of every mission."<sup>86</sup>

#### *Massed Action*

Though less immediately obvious, the changes here are no less significant.

In December 1974, Admiral Gorshkov wrote that because of the range and power of today's weapons, massed action "will no longer necessarily have to be realized in the form of participation of a large number of ships and aircraft"--not, it would seem, a new formulation, were it not for what Gorshkov added to it. Although massed action would involve only a "relatively small" number of *platforms*, it "will take the form of *concentration of...the weapons necessary to perform a combat mission*." And not incidentally, he--and others who followed--spoke not of "massing of forces," as had been the practice in the previous decade, but as "massing of forces and means."<sup>87</sup>



Since then, a number of authors have elaborated on this theme. "In order, for example, to overcome an antiship-missile defense and achieve the necessary number of hits," said one, "it is necessary to increase the number of missiles in a strike against one target.... The modern interpretation of massed action basically implies not the concentration of ships and aircraft, but of the power of a strike."<sup>88</sup> The "massed use of weapons," he added, "is a characteristic feature" of tactical actions today.<sup>89</sup> In other words, the emphasis has shifted to saturation of enemy defenses, overwhelming them with large numbers of missiles, if not necessarily with large numbers of platforms.

#### *Forms of Tactical Warfare*

Finally, the naval engagement has once again become the principal "form"--we would call it "scenario"--of warfare at sea at the tactical level. The engagement, wrote Gorshkov in 1974, "has always been and remains fundamental for the execution of tactical missions"<sup>90</sup>--a judgment he repeats in both editions of his book.<sup>91</sup> In fact, the term "naval tactics" itself is now defined as "the study and development of methods of preparing for and fighting the naval engagement."<sup>92</sup> Moreover, the "modern naval engagement," says the *Soviet Military Encyclopedia*, entails the participation of "mixed forces" and is characterized by "combined tactical action" and "massing of forces and means."<sup>93</sup>

Writing in 1977, a naval officer candidly acknowledged that the postwar development of "this part of the art of naval warfare" had been "tortuous." "With the advent of nuclear-missile weapons," he explained, "the role of naval tactics"--as opposed to force-arm tactics--"was somewhat reduced." The "qualitative leap" in the capabilities of "force arms such as submarines and aviation" engendered "a tendency to enhance the role of independent action by them, especially in forward areas." The strike became the "basic form" of tactical action for the Navy's missile forces, with the engagement remaining important "only" in "offshore areas." The role of "naval tactics" was "considerably degraded" as a result, and "attempts were even made to eliminate [naval tactics] as such from the art of naval warfare." But the "further development of the methods of waging warfare at sea" and the "experience of operational and tactical training," concluded this officer, "have changed this point of view."<sup>94</sup>

Neither combined action nor massed action, to be sure, have regained the status they once enjoyed of "categorical imperatives" of the art of naval warfare: Departures from combined action, says Gorshkov, are possible "in some instances";<sup>95</sup> and "massing of forces and means" does not--despite its name--actually imply that *forces* should be massed. And the strike, though no longer the "basic" form of tactical action in forward areas,<sup>96</sup> remains important enough for Gorshkov to imply that its effect on the outcome of naval engagements can "in certain conditions" be decisive.<sup>97</sup>

All the same, the 1970s have witnessed a real counterrevolution in Soviet naval tactical doctrine. Although the revolution in tactical thought has not quite come full circle, it has come most of the way; the conservative views of Stalbo's opponents, discarded only after long and contentious argument by the mid-1960s, have returned to the fore in the 1970s, as firmly entrenched as ever. Why were these conservatives wrong then, and why are they right today? What happened at the turn of the decade--what were the factors that made for this change?

#### CAUSES OF THE *VOLTE-FACE*

The evidence suggests that at least two, and possibly three, factors played a role.

#### *Reassessment of Enemy Defenses*

The first of these was a newfound respect for the strength of enemy defenses. By definition, an engagement is a bilateral contest, consisting of "reciprocal attacks, counterattacks, and their repulsion."<sup>98</sup> Surely, then, the Soviet Navy's revival of the naval engagement of *itself* implies a loss of confidence in its ability to destroy enemy forces with a preemptive strike before they can effectively respond.<sup>99</sup> But there is even more direct evidence than that.

"With the expansion of surveillance capabilities," wrote a Soviet flag officer in 1973, "the possibility of preempting the enemy in combat is becoming more and more difficult."<sup>100</sup> Massed action, another flag officer has stated, "has become even more important than before" because of the "increased...capabilities of aircraft-carrier task-force anti-missile, antiaircraft and antisubmarine defenses."<sup>101</sup> A passage in Gorshkov's *Sea Power of the State* suggests that the principle of combined action was revived for similar reasons: "The striking [power] and defensive capabilities of naval forces are continually increasing, which gives grounds for asserting that in the future combined tactical action will be required in order to overpower the enemy's organized and deeply-echeloned defense in an engagement."<sup>102</sup>

#### *Reassessment of Soviet Capabilities*

The second factor involved a reassessment of Soviet capabilities themselves. Only one unmistakable piece of evidence for this exists, but its remarkable candor and the stature of its author--Rear Admiral N.B. Pavlovich, a distinguished naval theorist and historian<sup>103</sup>--make it powerful evidence indeed. "The peculiarities of the new weaponry's properties," wrote Pavlovich in an article published late 1974,

compelled a review of a number of principles developed from the experience of World War II and to some degree from that of local wars in the postwar period. One of these principles was massed action....

The effectiveness of the new types of weapons, evinced in their increased lethal radius and accuracy, changed the estimate of the quantity of weapons and [launch] platforms needed to achieve the results

desired of a strike. But because their theoretical accuracy was somewhat overrated, the measure of weapons needed to achieve decisive results was set too low. This in turn affected the formation of views on the methods of employing forces delivering and supporting strikes.<sup>104</sup>

The "views" to which Pavlovich referred, of course, were those voiced by Stalbo in 1961 and Panteleev and Kharlamov 5 years later to the effect that massed action could no longer be considered a "basic" guide to force employment. But actually, wrote Pavlovich, massed action "can scarcely be disregarded," even in the best of worlds, because the number of weapons employed "by each attacking group ought to guarantee a quantity of hits such as would entail achieving the results that correspond to the objectives of the strike."<sup>105</sup>

The principle of combined action, according to Pavlovich, suffered because of the same blithe approach to the new weapons:

With the advent of nuclear-missile weapons, the accelerating development of the forces and weapons for a strike made the latter so powerful that successful delivery of it foreordained the further course of events. One would have thought, thanks to the high speed of [launch] platforms and weapons for a strike, that carrying it out had become simpler. In actual fact this is a far from simple task. Performing it requires thorough support. The efforts of mixed forces acting...in the interests of the forces delivering the strike are needed.<sup>106</sup>

Although advances in weapons technology made laps in the development of naval theory "especially dangerous," concluded Pavlovich,

it must not be forgotten that extreme judgments have at times appeared in the process of development of the military art and the art of naval warfare, [judgments] which arose because of one-sided or simply incorrect assessments of the results of a given event or of the true effectiveness of the means of attack....

The implementation of extreme views in the construction of naval forces or their reflection in naval theory--and particularly in documents that determine the forms and methods of employing these forces--can prove to be no less harmful than if the methods of warfare lag behind the capabilities afforded by the level attained by combat technology.<sup>107</sup>

#### *Increased Tactical Importance of Conventional Weapons*

The role played in the *volte-face* by the third factor--if, in fact, it really was a factor--cannot be ascertained with anything like the certainty of the other two. Because of its potential importance, however, it must be discussed here.

Since the early 1970s, a number of Soviet theorists have pointed to the growing role of conventional weapons in warfare at sea at both the operational and tactical levels. Writing in 1973, for example, a Soviet theorist stated that modern naval operations would be characterized by the "mass [massovoe] use of a variety of the latest [a euphemism for "nuclear"] and conventional weaponry," and that the navies of "the largest countries" were equipping their forces with "not only the latest weapons of great lethality, but also conventional weapons."<sup>108</sup> In a 1977 article on the "basic features of the modern naval engagement," another theorist wrote that "the naval engagement has come to be

regarded primarily as a combination of conventional and nuclear strikes by mixed naval forces, coordinated as to target, place and time."<sup>109</sup> Clearly, then, conventional weapons have become more than just the "auxiliary means" of warfare they were in the 1960s.

What is not so clear is whether this change was a cause (that it was *the* cause may be safely dismissed given the evidence that there were others involved) or an effect of the counterrevolution in tactical doctrine.

As a cause, the return to favor of conventional weapons looks plausible, for in the measure that they became more respectable, so too would force employment principles originally formulated with their use in mind. Did the Soviets conclude, for example, that nuclear weapons were not always appropriate in tactical situations---too "dirty," perhaps, for employment outside the strategic context? The references to *combined* use of nuclear and conventional weapons militate against this as an answer. Did they decide there were some things they could do *better* with conventional munitions? It is difficult to think of any, if one grants that the main purpose of warfare at sea is to destroy the enemy or at least render him impotent. Or did they decide there were some things they could do *well enough* with conventional weapons and therefore more cheaply? Perhaps so: fissile materials are expensive to process and nuclear warheads expensive to build and maintain.



But the renewed importance of conventional weapons is equally plausible as an effect, especially of the requirement for massed action. If one must allow for the possibility of large losses of missiles to enemy fire, saturation of enemy defenses with massed all-nuclear strikes is hardly cost effective: the aim of diluting the defensive effort is just as well served if some of the missiles have the less expensive--and more expendable--conventional warheads.

#### HOW IT MAY ALL FIT TOGETHER

Despite this uncertainty, the main directions in the postwar progression of Soviet naval tactical thought are plain. A prolonged debate in the early 1960s ended in victory for those theorists who believed that the arrival of nuclear-missile weapons called for far-reaching changes in some basic tenets of Soviet naval tactics. Those who defended the old views "lost" the debate primarily because they were unable or even unwilling to challenge many of the reformers' key arguments. Like the reformers, they too stood in awe of the new weapons, which made their advocacy of massed action seem pointless; none of them doubted that the time factor was critical, which made their insistence on combined action, given the time it consumed, seem reckless; and since victory--indeed, survival itself--depended on preemption, how could one speak of *engaging* the enemy? Almost



inevitably, therefore, independent action, especially by submarines and aircraft, became the basic principle, and the preemptive strike the basic "form," of naval tactical warfare in forward areas.

By the early 1970s, the confident outlook reflected in that doctrine--and in Sokolovskiy's claims that the aircraft carrier was "a highly vulnerable target"<sup>110</sup>--was badly shaken. The Soviets realized they had underrated the enemy's ability to defend himself and overrated their own ability to destroy him quickly, cleanly, and economically. Mere preemption would not assure his elimination; the prospects of avoiding engagements with him had faded; massed action no longer was pointless, nor combined action reckless; and conventional weapons, once the stepchild of the nuclear age, found new respectability.

In varying degrees, the new generation of surface combatants and submarines embodies this counterrevolution in Soviet tactical thought, particularly where the principle of massed action--or, more precisely, saturation--is concerned. For among the many differences between the new platforms and their generational predecessors, none is so striking as the difference in number of missile launchers. The *Oscar* class SSGN, for example, has twenty-four such launchers--three times the number carried by the *Charlie* and *Echo-II* classes, and six times as many as the *Juliett* class SSG. *Kirov*, the new cruiser, has twenty SSM launchers, or five times the number found on the last SSM cruiser design before it, *Kresta-I*.<sup>111</sup>

The revival of combined action as a "paramount" principle of naval warfare is not nearly as obvious in the new designs, nor should we expect it to be, since it is more relevant to how forces should be employed than to how they should be designed. Nevertheless, it may well have something to do with the Soviet Navy's renewed interest in building SSM-firing cruisers, perhaps for combined submarine-, surface-ship-, and air-launched strikes against enemy high-value targets.<sup>112</sup>

Finally, the return of the naval engagement--*morskoy boy*--as the Soviet Navy's "basic" tactical scenario is consistent with, and is very likely reflected in, its present reported attempts to develop a CTOL aircraft carrier to improve, among other things, its fleet air defense capabilities.

## NOTES

<sup>1</sup>*Sovetskaya Voennaya Entsiklopediya* [hereafter referred to as *SVE*], vol. 6 [Moscow: Voenizdat, 1978], p. 53, s.v. "Operativnoe iskusstvo".

<sup>2</sup>See S. Filonov, "Morskaya operatsiya," *Morskoy sbornik* (hereafter cited as *MS*), No. 10, October 1977, p. 22.

<sup>3</sup>The discussion was initiated by James M. McConnell of the Center for Naval Analyses, who suggested in a 1974 analysis of Admiral Gorshkov's "Navies in War and Peace" that the Soviets had adopted a strategy of withholding a portion of their SLBMs in a general nuclear war in order to influence the shape of the postwar peace, should both the principal belligerents involved survive the war. See "Admiral Gorshkov on 'Navies in War and Peace,'" CNA Research Contribution 257, September 1974, pp. 71-116.

<sup>4</sup>Compare the *Oscar* class, which carries 24 missile tubes, with the *Charlie*-, *Echo-II*-, and *Juliett*-class cruise-missile submarines, which have 8, 8, and 4 tubes, respectively. The *Kirov* has 20 SSM launchers, while the 4 *Kresta-I*-class ships each have only 4. See *Jane's Fighting Ships*, 1981-1982.

<sup>5</sup>The distinction between "form" and "content" in Soviet military doctrine issues directly from that made by Marxist-Leninist philosophy, where form and content are said to "reflect the interaction of the two sides of every phenomenon." Each phenomenon's content, on the one hand, is "the sum total of all [its] component elements, characteristics, connections, contradictions, and developmental tendencies," while its form on the other hand is "the relatively stable association between [its] elements, [i.e.] its internal organization and structure...its outward expression" (*SVE*, vol. 7 [Moscow, 1979], p. 425, s.v. "Soderzhanie i forma"). For a discussion of the subject in its military embodiment, see *ibid.*, pp. 501-502, s.v. "Sposoby boevykh deystviy"; and *ibid.*, vol. 8 (Moscow, 1980), p. 305, s.v. "Formy boevykh deystviy."

<sup>6</sup>*Ibid.*, vol. 2 (Moscow, 1976), pp. 161-163, s.v. "Vnezapnost'."

<sup>7</sup>*Ibid.*, vol. 6 (Moscow, 1978), pp. 542-543, s.v. "Printsipy voennogo iskusstva."

<sup>8</sup>About categories, Bertrand Russell once wrote: "What, exactly, is meant by the word 'category,' whether in Aristotle or in Kant and Hegel [he might just as well have added Marx to the list], I must confess that I have never been able to understand. I do not myself believe that the term 'category' is in any way useful in philosophy, as representing any clear idea" (*A History of Western Philosophy* [New York: Simon and Schuster, 1945], pp. 199-200).

<sup>9</sup>*SVE*, vol. 4 (Moscow, 1977), p. 121, s.v. "Kategorii voennoy nauki."

<sup>10</sup>See notes 7 and 9 above, respectively. Nevertheless, confusion persists, as witness Gorshkov's use of the terms in the second edition of *Sea Power of the State*, where he introduces his section on "Theoretical Questions of the Art of Naval Warfare" by saying "let us briefly discuss some principles of naval [force] employment," and then proceeds to call them all "categories of the art of naval warfare" (*Morskaya moshch' gosudarstva*, 1st ed. [Moscow: Voenizdat, 1976], pp. 361-380; 2nd ed. [Moscow: Voenizdat, 1979], pp. 330-346).

<sup>11</sup>See N.P. V'yunenkov, "O nekotorykh tendentsiyakh v razvitii morskoy taktiki," *MS*, No. 10, October 1975, pp. 21-26. A March 1978 article in the same journal commemorating the 130th anniversary of its founding supports this point. Appraising the journal's section on "The Art of Naval Warfare," the author writes that articles such as V'yunenkov's help Soviet officers to "develop unified tactical thinking" and prompt them to "analyze and interpret...events arising in the course of tactical and operational training" (I. Gordeev, "Nash zhurnal," *MS*, No. 3, March 1978, p. 25).

<sup>12</sup>See B. Rodionov, I. Novichkov, "Problema PRO: Razreshima li ona?," *MS*, No. 5, May 1978, pp. 96-103.

<sup>13</sup>K.A. Stalbo, "Avianostsy vo vtoroy mirovoy voyne," *MS*, No. 1, January 1978, pp. 91-100.

<sup>14</sup>*Idem*, "Avianostsy v poslevoenny period," *MS*, No. 6, June 1978, pp. 91-100.

<sup>15</sup>*Ibid.*, p. 94.

<sup>16</sup>*SVE*, vol. 3 (Moscow, 1977), pp. 225, s.v. "Doktrina voennaya."

<sup>17</sup>*Spravochnik ofitsera* [Moscow: Voenizdat, 1971], 398 pp.

<sup>18</sup>V.D. Sokolovskiy (ed.), *Voennaya strategiya* [Moscow: Voenizdat, 1968], 464 pp.

<sup>19</sup>Books published as part of the "Officer's Library" are apparently designed to serve as "textbooks for the self-education of a wide circle of Soviet officers" (Sokolovskiy, *op.cit.*, p. 4).

<sup>20</sup>See S. Ye. Zakharov (ed.), *Istoriya voenno-morskogo iskusstva* [Moscow: Voenizdat, 1969], 575 pp.

<sup>21</sup>See James M. McConnell, "The Gorshkov Articles, the New Gorshkov Book and Their Relation to Policy," in Michael McGwire and John McDonnell (eds.), *Soviet Naval Influence: Domestic and Foreign Dimensions* (New York: Praeger Publishers, 1977), pp. 604-612.

<sup>22</sup>A. Gontaev, "Flot v voyne: opyt i uroki," *MS*, No. 4, April 1975, p. 104.

<sup>23</sup>McConnell, *op.cit.*, p. 611. "Contemporary Soviet military doctrine," says the *Soviet Military Encyclopedia*, "is a system of guiding principles, of scientifically substantiated views of the CPSU and the Soviet Government on the essence, character, and methods of waging a war that may be thrust upon the Soviet Union by the imperialists, as well as on the military...preparation of the Armed Forces and the nation to crush the aggressor" (*SVE*, vol. 3, p.229, s.v. "Doktrina voennaya").

<sup>24</sup>Vice-Admiral Stalbo has been involved in a number of these recently. For example, (1) his article on aircraft carriers in World War II ("Avianostsy vo vtoroy mirovoy voyne") was attacked by the journal's chief editor for not giving "due attention to the vulnerability of these ships to submarine weapons" (A. Pushkin, "Boevye deystviya amerikanskikh i yaponskikh podvodnykh lodok protiv avianostsev v period vtoroy mirovoy voyny," *MS*, No. 9, September 1979, p. 12); (2) the main points of his article on the development of views on submarines ("Razvitie vzglyadov na podvodnye sily," *MS*, No. 9, September 1979, pp. 81-87) were characterized by Vice-Admiral Gontaev as "insufficiently convincing," "one-sided" and even "tendentious" ("Na avanstsene nauchno-tekhnicheskoy revolyutsii," *MS*, No. 2, February 1980, pp. 80-90); and (3) in a two-part article published in 1981 on the "theory of the development and employment of the Navy" ("Nekotorye voprosy teorii razvitiya i ispol'zovaniya VMF," *MS*, No. 4, April 1981, pp. 20-28 and No. 5, May 1981, pp. 17-27), he asks that his thoughts (which "remain the author's opinion only") be "amplified and critically appraised by the journal's readers" (No. 5, p. 27); to date, four responses have been published (G. Kostev, "Ob osnovakh teorii Voenno-Morskogo Flota," *MS*, No. 11, November 1981, pp. 24-29; V. Chernavin, "O teorii Voenno-Morskogo Flota," *MS*, No. 1, January 1982, pp. 20-24); V. Sysoev, "Teoriya upravleniya Voenno-Morskim Flotom," *MS*, No. 3, March 1982, pp. 21-27; B. Makeev, "Nekotorye vzglyady na teoriyu vooruzheniya VMF," *MS*, No. 4, April 1982, pp. 27-31.

<sup>25</sup>See Yu. Bystrov, "Zavoevanie gospodstva na more," *MS*, No. 3, March 1977, pp. 17, 20 ("The experience of [the second world] war showed that winning command of the sea is impossible without a preponderance of forces in the air"; "Command of the sea has become unthinkable without command of the air...."); A. Pushkin, *op.cit.*, p. 11 ("A paramount factor of command of the sea in ocean areas [in World War II] was command of the air...."); G. Kostev, *op.cit.*, p. 25 ("...winning command of the sea is virtually unthinkable without winning command of the air.")

<sup>26</sup>I. Korotkov, "O razvitii sovetskoy voennoy teorii v poslevoennye gody," *Voenno-istoricheskii zhurnal*, No. 4, April 1964, p. 44.

<sup>27</sup>*The Penkovskiy Papers*, (Garden City, New York: Doubleday and Company, 1965), p. 251. A 1976 history of the Soviet General Staff Academy corroborates this date in a description of a lecture delivered in August 1959 at the Academy by the then Chief of the General Staff Marshal V.D. Sokolovskiy:

A lecture by the Chief of the General Staff delivered at the Academy in August 1959...acquainted the Academy's leaders, professors, instructors and students with the new views on the probable character of a future war...and pointed to the tasks of Soviet military strategy that followed therefrom.

The lecturer's basic propositions, which defined the general direction of the development and preparation of the Soviet Armed Forces for the immediate future, became the foundation not only of the [Academy's] strategy course, but of the entire training program for generals and officers at the General Staff Academy.

See V.G. Kulikov (ed.), *Akademiya General'nogo shtaba* (Moscow: Voenizdat, 1976), pp. 152-153.

<sup>28</sup>N. Lomov, "O sovetskoy voennoy doktrine," *Kommunist Vooruzhennykh Sil*, No. 10, May 1962, p. 11 (Colonel-General Lomov was Chairman of the Department of Strategy at the General Staff Academy at the time. See V.G. Kulikov, *op. cit.*, pp. 157, 185).

<sup>29</sup>K.A. Stalbo, "O nekotorykh kategoriakh voenno-morskogo iskusstva v sovremennom ikh proyavlenii," *MS* No. 1, January 1961, p. 17.

<sup>30</sup>*Ibid.*, p. 17.

<sup>31</sup>*Ibid.*, p. 18.

<sup>32</sup>*Ibid.*, p. 19.



<sup>33</sup>*Ibid.*, p. 19.

<sup>34</sup>*Ibid.*, p. 19-20.

<sup>35</sup>*Ibid.*, p. 20.

<sup>36</sup>*Ibid.*, p. 20.

<sup>37</sup>*Ibid.*, p. 21.

<sup>38</sup>*Ibid.*, p. 21-22.

<sup>39</sup>*Ibid.*, p. 23.

<sup>40</sup>*Ibid.*, p. 22-23.

<sup>41</sup>*Ibid.*, p. 23.

<sup>42</sup>See V.S. Lisyutin, "K voprosu o kategoriakh voenno-morskogo iskusstva v sovremennykh usloviyakh," *MS*, No. 3, March 1961, pp. 14-22; V.S. Sysoev, "Ob izmenenii soderzhaniya nekotorykh ponyatiy voenno-morskogo iskusstva," *MS*, No. 4, April 1961, pp. 22-30; "O nekotorykh printsipakh voenno-morskogo iskusstva v sovremennykh usloviyakh," *MS*, No. 10, October 1961, pp. 16-25; B.F. Petrov, "Taktika flota i predmet ee issledovaniya," *MS*, No. 7, July 1962, pp. 24-31; N.V. Sukhodol'skiy, "O formakh i zakonomernostyakh boevykh deystviy na more," *MS*, No. 10, October 1962, pp. 19-25; A.G. Svetlov, "O vzaimodeystvii v morskoy boyu," *MS*, No. 12, December 1962, pp. 18-25; B.P. Molotkov, "Ob izmenenii form boevykh deystviy na more v svyazi s razvitiem sredstv vooruzhennoy bor'by," *MS*, No. 3, March 1963, pp. 24-27; L.A. Emel'yanov, "K voprosu o taktike flota i predmete ee issledovaniya," *MS*, No. 4, April 1963, pp. 23-28; B.N. Ivanov, "O predmete issledovaniya taktiki," *MS*, No. 6, June 1963, pp. 27-30; Yu. V. Kolesnikov, "O nekotorykh kategoriakh taktiki flota," *MS*, No. 11, November 1963, pp. 19-24; "Teoriya voenno-morskogo iskusstva i sovremennyy flot," *MS*, No. 2, February 1964, pp. 41-47.

<sup>43</sup>Lisyutin, *op.cit.*, p. 16; see also V.T. Protsenko, cited in "O nekotorykh printsipakh voenno-morskogo iskusstva v sovremennykh usloviyakh," p. 16.

<sup>44</sup>M.E. Krasnokutskiy, cited in *ibid.*, p. 19; also B.V. Nikitin, cited in *ibid.*, p. 19; and V.I. Mateev, cited in *ibid.*, pp. 18-19.

<sup>45</sup>Svetlov, *op.cit.*, p. 19; also Sysoev, *op.cit.*, p. 23.



<sup>46</sup>*Ibid.*, p. 23.

<sup>47</sup>Lisyutin, *op.cit.*, pp. 17-18.

<sup>48</sup>Svetlov, *op.cit.*, p. 20.

<sup>49</sup>Nikitin, *op.cit.*, p. 20.

<sup>50</sup>Krasnokutskiy, *op.cit.*, p. 21.

<sup>51</sup>See S.G. Gorshkov, "Resheniya XXII s"ezda KPSS i zadachi voennykh moryakov," *MS*, No. 1, January 1962, p. 17: "when carrying out both theoretical and practical tasks, it is necessary to proceed from the fact that the enemy will offer strong opposition during the fight. In order to overcome this opposition, massed use of forces and combined action of all the forces assigned to perform a combat mission will be required."

<sup>52</sup>On massed action: "Compared to conventional weapons, nuclear-missile weapons possess incomparably greater hit probabilities and colossal destructive capabilities. Some weapon models virtually defy shooting down with current defensive means. Of course...one should take into account the expected level of enemy resistance and the conditions that ensure hitting the designated target.... So does it follow from this that a [tactical] nuclear-missile strike...is characterized by the massed use of forces?" (Kolesnikov, *op.cit.*, p. 23). On combined action: "Today all the conditions exist that permit abandoning the obligatory principle of combined action..." (Protsenko, *op.cit.*, p. 24); "the improved tactical properties of modern weapons considerably diminish the interdependence of forces in an engagement..." (Sysoev, *op.cit.*, p. 24); "The increased combat capabilities of the modern navy's force arms in many cases also permits employing them independently in an engagement (without coordinating their actions with the striking forces of other force arms)" (Sukhodol'skiy, *op.cit.*, p. 35).

<sup>53</sup>Speech by Defense Minister R. Ya. Malinovskiy at the Twenty-third CPSU Congress, 23 October 1961; text in *Krasnaya zvezda*, 24 October 1961, pp. 3-4. Even Gorshkov conceded that "the new conditions of warfare imperatively demand that many established tenets of military science be reexamined." See "Resheniya XXII s"ezda KPSS i zadachi voennykh moryakov," p. 17.

<sup>54</sup>Nikitin, *op.cit.*, pp. 18-19: "It would be wrong to rule out the possibility that conventional weapons will be used...and to proceed from [the assumption] that in all cases the objectives of an engagement will be achieved only with nuclear-missile weapons"; to which Kolesnikov (*op.cit.*, pp. 19-20) replied: "Our military science has been forced to regard nuclear-missile weapons as the main means of achieving victory over the enemy. We emphasize--the main [means], and not a reserve [means], nor an auxiliary [means], nor a means for exploiting a breakthrough obtained as a result of employing conventional weapons. Conversely, conventional weapons have become not the main [means], but a supplementary and sometimes reserve means. These premises are also, in our opinion, the point of departure when examining the forms of warfare at sea both on an operational and on a tactical scale."

<sup>55</sup>Lisyutin, *op.cit.*, p. 16; Protsenko, *op.cit.*, p. 16.

<sup>56</sup>Stalbo, "O nekotorykh kategoriakh voenno-morskogo iskusstva v sovremennom ikh proyavlenii," p. 19. A belief in the fantastic accuracy of guided missiles pervaded Soviet writings of the time; references to hit probabilities of between 60 and 90 percent were common. See V.G. Rog, "Vliyanie raketno-yadernogo oruzhiya na primeneniye aviatsii na more," *MS*, No. 6, June 1963, p. 34 ("The probability that one SAM...will hit an air target flying at an altitude of 18 kilometers is 65 percent"); P.N. Verin, K.V. Morozov, *Raketnoye oruzhie protivovozdushnoy oborony na more* [Moscow: Voenizdat, 1964], p. 9 ("The average probability of hitting a maritime target with a guided missile and a conventional gravity bomb in the same conditions is 60-80 percent and 1-2 percent, respectively") and p. 44 ("A modern [jet] aircraft...can be shot down with one or, at worst, two surface-to-air missiles"); B.F. Petrov, "Soderzhanie i kharakter sovremennykh boevykh deystviy na more," *MS*, No. 1, January 1965, p. 14 ("Missiles, especially those equipped with homing devices and designed to hit sea and air targets, have a hit probability of 60-90 percent").

<sup>57</sup>Stalbo, "O nekotorykh kategoriakh voenno-morskogo iskusstva v sovremennom ikh proyavlenii," p. 19.

<sup>58</sup>Matveev, *op.cit.*, p. 20.

<sup>59</sup>Svetlov, *op.cit.*, p. 25. See also Lisyutin, *op.cit.*, p. 20; Nikitin, *op.cit.*, p. 20; editors of *Morskoy sbornik*, in *ibid.*, pp. 24-25.

<sup>60</sup>Svetlov, *op.cit.*, p. 19. See also Lisyutin, *op.cit.*, pp. 16-17; Nikitin, *op.cit.*, p. 20; Editors of *Morskoy sbornik*, *op.cit.*, p. 24.

<sup>61</sup>"Teoriya voenno-morskogo iskusstva i sovremenny flot," *MS*, No. 2, February 1964, p. 45.

<sup>62</sup>*Ibid.*, p. 45.

<sup>63</sup>*Ibid.*, pp. 45-46.

<sup>64</sup>*Ibid.*, p. 46.

<sup>65</sup>Stalbo, "O nekotorykh kategoriakh voenno-morskogo iskusstva v souremennom ikh proyavlenii," pp. 19-20.

<sup>66</sup>*Bol'shaya Sovetskaya Enstiklopediya*, 2nd ed., vol. 5 (Moscow, 1950), p. 378, s.v. "Boy."

<sup>67</sup>Petrov, "Taktika flota i predmet ee issledovaniya," pp. 27-28; Molotkov, *op.cit.*, p. 25. The notion that modern weapons could be fired from standoff ranges was also echoed outside the confines of this debate in a number of articles and publications. See, *inter alia*, V.G. Rog, *op.cit.*, p. 32 ("The employment of air-to-surface guided missiles can rule out opposition from shipboard antiaircraft weapons against missile-carrying aircraft, and under some conditons missile-carrying aircraft can deliver a strike without entering the area of action of fighters providing air cover for ships"); A.N. Sukhanov, "Vliyanie razvitiya tekhniki i oruzhiya na taktiku aviatsii pri deystviyakh po korabylam v more," *MS*, No. 4, April 1961, pp. 35-36 ("Some types of guided missiles...possess a range...that permits attacking a target from distances that exceed the combat radius of some types of shipboard fighters"). In the event that fighters were encountered, these and other writers doubted that they could provide effective opposition in anything less than optimal conditions (no ECM, good visibility, etc.). See Rog, *op.cit.*, pp. 34-36; K.V. Morozov, *Korabel'nye sredstva protivovozdushnoy oborony* [Moscow: Voenizdat, 1960] pp. 101-102; P.N. Verin, K.V. Morozov, *op.cit.*, p. 122; I.I. Kolosov, "Deystviya aviatsii po korablyam v more v usloviyakh radioprotivodeystviya," *MS*, No. 3, March 1962, pp. 40-42; S.A. Gulyaev, "Rol' aviatsii v boevykh deystviyakh na more v sovremennykh usloviyakh," *MS*, No. 6, June 1965, pp. 41-42.

<sup>68</sup>"Teoriya voenno-morskogo iskusstva i sovremennyy flot," pp. 42-43. Boldface in original.

<sup>69</sup>*Ibid.*, pp. 44-45.

<sup>70</sup>N.M. Kharlamov, "Tendentsii razvitiya voenno-morskikh flotov," *MS*, No. 1, January 1966, p. 34.

<sup>71</sup>Yu. A. Panteleev, "Nekotorye voprosy deystviy flota v sovremennoy voyne," *MS*, No. 2, February 1966, pp. 28-29.

<sup>72</sup>See notes 18 and 19.

<sup>73</sup>Admiral Kharlamov was formerly commander-in-chief of the Baltic Sea Fleet (1950-1954). At the time his article was published, he was involved in "responsible duties in the Navy's central apparatus"--probably its Main Staff (*Bol'shaya Sovetskaya Entsiklopediya*, 3rd ed., vol. 28 [Moscow, 1978], p. 201). Admiral Panteleev, a former commander-in-chief of the Pacific Ocean Fleet (1951-1955), wrote as the head of the Soviet Naval Academy (*SVE*, vol. 6 [Moscow, 1978], pp. 206-207).

<sup>74</sup>Panteleev, *op.cit.*, p. 28.

<sup>75</sup>Kharlamov, *op.cit.*, p. 34.

<sup>76</sup>S.G. Gorshkov, "Razvitie sovetskogo voenno-morskogo iskusstva," *MS*, No. 2, February 1967, p. 21.

<sup>77</sup>See *Bol'shaya Sovetskaya Entsiklopediya*, 2nd ed., vol. 41 (Moscow, 1956), p. 543, s.v. "Taktika Voennno-Morskogo Flota"; *Morskoy slovar'*, vol. 2 [Moscow: Voenizdat, 1959], p. 403, s.v. "Morskaya taktika."

<sup>78</sup>L.A. Emel'yanov, *op.cit.*, pp. 24-25 (boldface in original).

<sup>79</sup>N.P. V'yunenkov, "Sovetskoe voenno-morskoe iskusstvo nakanune Velikoy Otechestvennoy voyny," *MS*, No. 6, June 1971, p. 32. Although Admiral Gorshkov, writing in 1967 on the history of Soviet naval theory, had found much to commend in the *Combat Manual's* treatment of operational and tactical issues, he pointedly reproached postwar theorists for trying to apply its provisions in the nuclear-missile age, singling out for criticism their determination to make "any" tactical action against enemy surface ships a matter of "delivering the main strike in coastal waters of necessity with a combined naval force." This "could not be justified," since it "inevitably promoted the entrenchment of hackneyed methods of naval force employment in combat" and "restricted the initiative" of tactical commanders ("Razvitie sovetskogo voenno-morskogo iskusstva," p. 17). V'yunenkov's article contained no such afterthoughts.

<sup>80</sup>N. Aleshkin, "Nekotorye tendentsii razvitiya voenno-morskikh sil," *MS*, No. 1, January 1972, p. 29.

<sup>81</sup>"Voenno-morskie floty v voynakh i v mirnoe vremya," *MS*, No. 5, May 1972, p. 24. In a later article in "Navies in War and Peace," Gorshkov wrote that during the Second World War "homogeneous naval tactical formations [*soedineniya*] were transformed into mixed [tactical formations], which permitted the execution of the most probable missions of the war at sea. The methods of combined action against the enemy by different force arms and types of weapons...were developed and improved" (*ibid.*, *MS*, No. 11, November 1972, p. 32).

<sup>82</sup>G. Kostev, "Vzaimodeystvie--vazhneyshiy printsip ispol'zovania sil," *MS*, No. 2, February 1974, p. 28.

<sup>83</sup>*Ibid.*, p. 29.

<sup>84</sup>*Ibid.*, p. 30 (emphasis in original).

<sup>85</sup>*Ibid.*, p. 53.

<sup>86</sup>*Morskaya mosch' gosudarstva*, 1st ed., pp. 367-368; 2nd ed., p. 335. See also Gorshkov, "Nekotorye voprosy razvitiya voenno-morskogo iskusstva," *MS*, No. 12, December 1974, p. 28; N.P. V'yunenko, "O nekotorykh tendentsiyakh v razvitii morskoy taktiki," pp. 22-23; *SVE*, vol. 2 (Moscow, 1976), pp. 123-124, s.v. "Vzaimodeystvie"; V.S. Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," *MS*, No. 4, April 1977, p. 24; M. Iskanderov, "Razvitie boya," *MS*, No. 5, May 1980, p. 31.

<sup>87</sup>"Nekotorye voprosy razvitiya voenno-morskogo iskusstva," p. 28 (emphasis mine). The expression "massing of forces and means" (*massirovanie sil i sredstv*) or, alternatively, "massing of forces and weapons" (*massirovanie sil i oruzhiya*) can be found in most of the treatments of the subject since 1974. See N. Pavlovich, "Osnovnye faktory razvitiya voenno-morskogo iskusstva," *Voenno-istoricheskii zhurnal*, No. 12, December 1974, p. 50; V.S. Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," pp. 24-25; V. Chernavin, "O teorii Voenno-Morskogo Flota," p. 23; *SVE*, vol. 5 (Moscow, 1978), pp. 179-180, s.v. "Massirovanie sil i sredstv." For references to "massing of forces" only, see V'yunenko, "O nekotorykh tendentsiyakh v razvitii morskoy taktiki," p. 25; K.A. Stalbo, "Nekotorye voprosy teorii razvitiya i ispol'zovaniya VMF," *MS*, No. 5, May 1981, p. 21.



<sup>88</sup>Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," pp. 24-25.

<sup>89</sup>*Ibid.*, p. 27.

<sup>90</sup>"Nekotorye voprosy razvitiya voenno-morskogo iskusstva," p. 26.

<sup>91</sup>*Morskaya moshch' gosudarstva*, 1st ed., p. 366; 2nd ed., p. 333.

<sup>92</sup>*SVE*, vol. 7 (Moscow, 1979), p. 631, s.v. "Taktika voenno-morskogo flota." See also Stalbo, "Nekotorye voprosy teorii razvitiya i ispol'zovaniya VMF," *MS*, No. 4, April 1981, p. 27: "The theory of naval tactics develops, studies and investigates that realm of the art of naval warfare where the highest and basic form of [naval] action is the naval engagement--the basic means of attaining victory."

<sup>93</sup>*SVE*, vol. 1 (Moscow, 1976) p. 547, s.v. "Boy morskoy."

<sup>94</sup>Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," p. 24. Mamchits appears to be referring to the proposed elimination by one of the participants in the 1960s debate of the term "general naval tactics" (see above, p. 19-20): "Then [only] force arm tactics and the operational art would remain" as components of the art of naval warfare (see Emel'yanov, *op.cit.*, p. 25).

<sup>95</sup>*Morskaya moshch' gosudarstva*, 1st ed., p. 367; 2nd ed., p. 335.

<sup>96</sup>See *SVE*, vol. 8 (Moscow, 1980), p. 305, s.v. "Formy boevykh deystviy," where the strike is listed as a form of warfare, but not as a basic form of warfare, either at the tactical, operational or strategic level.

<sup>97</sup>*Morskaya moshcha' gosudarstva*, 1st ed., p. 365; 2nd ed., p. 333; "Nekotorye voprosy razvitiya voenno-morskogo iskusstva," p. 25. Gorshkov's statement that the strike "is becoming increasingly equivalent to the engagement," however, should not mislead us into thinking that nothing has changed. Writing in 1980, Admiral Sysoev, the current chief of the Soviet Naval Academy, makes clear that the strike--though "becoming equivalent to the engagement"--remains only an "element" of it, albeit one of the "main" ones (V.S. Sysoev, "Razvitie form vooruzhennoy bor'by na more," *MS*, No. 11, November 1980, p. 24).

<sup>98</sup>*SVE*, vol. 1 (Moscow, 1976), p. 547, s.v. "Boy morskoy."

<sup>99</sup>Soviet statements are consistent with this inference. According to Mamchits, naval striking forces must "possess not only power enough to defeat the enemy, but also the appropriate combat stability, in order to hold out against enemy fire.... Questions of ensuring the combat stability of forces in all phases of an engagement have become especially important" ("Osnovnye osobennosti sovremennogo morskogo boya," pp. 25-26).

<sup>100</sup>A. Gontaev, "Vnezapnost' kak kategoriya voenno-morskogo iskusstva," *MS*, No. 3, March 1973, p. 35. Other examples: "As armaments develop the role of surprise is becoming even more important.... At the same time the capabilities of reconnaissance and early warning of missile attack have increased.... In modern conditions the role of surprise has become more important by far than before. But at the same time achieving it has become much more difficult" (Stalbo, "Nekotorye voprosy teorii razvitiya i ispol'zovaniya VMF," *MS*, No. 5, May 1981, p. 221); "Since the advent of [fighter?] aircraft and thereafter of radar and other more sophisticated detection systems, the struggle to actualize the surprise factor in warfare at sea has intensified" (Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," p. 25).

<sup>101</sup>V. Chernavin, "O teorii Voennno-Morskogo Flota," p. 23. See also Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," p. 24 ("The increased defensive capabilities of navies and the enhancement of the combat stability of ships and tactical formations have necessitated an even greater massing of forces and weapons in an engagement").

<sup>102</sup>Gorshkov, *Morskaya moshch' gosudarstva*, 1st ed., p. 367, 2nd ed., p. 335.

<sup>103</sup>(U) Nikolay Bronislavovich Pavlovich chaired the Soviet Naval Academy's Department of General Naval Tactics during the second World War and coauthored the Soviet Navy's 1945 *Combat Manual* (*Voprosy taktiki v sovetskikh voennykh trudakh (1917-1940 gg.)*) [Moscow: Voenizdat, 1970], p. 445). A number of sources credit Pavlovich with exerting a substantial influence on the development of Soviet naval tactics during the war. (Gorshkov, "Razvitie sovetskogo voenno-morskogo iskusstva," p. 14; *SVE*, vol. 2 [Moscow, 1976], p. 231, s.v. "Voennno-morskaya akademiya imeni Marshala Sovetskogo Soyuza A.A. Grechko"; A. Orel, "V gody voyny," *MS*, No. 1, January 1977, p. 18). After the war, Pavlovich edited a two-volume work on navies in the First World War (*Flot v pervoy mirovoy voyne* [Moscow: Voenizdat, 1964]), and coauthored (with Admiral V.I. Achkasov) a history of Soviet naval warfare in World War II (*Sovetskoe voenno-morskoe iskusstvo v Velikoy Otechestvennoy voyne* [Moscow: Voenizdat, 1973]).



<sup>104</sup>"Osnovnye factory razvitiya voenno-morskogo iskusstva," p. 50 (emphasis mine). Pavlovich died in late June 1973 (see obituary in *Krasnaya zvezda*, 30 June 1973, p. 4); the article was published posthumously.

<sup>105</sup>*Ibid.*, pp. 50-51.

<sup>106</sup>*Ibid.*, p. 51.

<sup>107</sup>*Ibid.*, pp. 51-52.

<sup>108</sup>B. Bannikov, "Kharakternye cherty sovremennykh morskikh operatsiy," *VM*, No. 3, March 1973.

<sup>109</sup>Mamchits, "Osnovnye osobennosti sovremennogo morskogo boya," p. 24.

<sup>110</sup>*Voennaya strategiya*, 3rd ed. (1968), pp. 363, 364. Surely the evidence adduced in this paper suggests that such statements were not all bluff! However, for a contrary view, see Robert W. Herrick, *Soviet Naval Strategy* (Annapolis, Maryland: United States Naval Institute, 1968), p. 118.

<sup>111</sup>*Jane's Fighting Ships*, 1981-1982

<sup>112</sup>An apparent "fly in the ointment," of course, is the *Kiev* class, design work for which probably began in the first half of the 1960s, but which is equipped with eight SS-N-12 launchers. One explanation may be that the launchers were added to the ship much later in the design phase. Unfortunately, this explanation is extremely difficult to confirm, given that a full history of *Kiev's* design phase is unlikely to come to light.

# SOVIET SOURCES CITED

- Aleshkin, N. "Nekotorye tendentsii razvitiya voenno-morskikh sil" [Some trends in the development of naval forces]. *Morskoy sbornik*, No. 1, January 1972, pp. 24-30.
- Bannikov, B. "Kharakternye cherty sovremennykh morskikh operatsiy" [Characteristic features of modern naval operations]. *Voennaya mysl'*, No. 3, March 1973, pp. 27-33.
- "Boy" [Engagement]. *Bol'shaya Sovetskaya Entsiklopediya*. 2nd rev. ed., vol. 5. Moscow: Bol'shaya sovetskaya entsiklopediya, 1950, pp. 378-379.
- "Boy morskoy" [Naval engagement]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 1. Moscow: Voenizdat, 1976, pp. 546-547.
- Bystrov, Yu. "Zavoevanie gospodstva na more" [Winning command of the sea]. *Morskoy sbornik*, No. 3, March 1977, pp. 15-20.
- Chernavin, V. "O teorii Voennno-Morskogo Flota" [The theory of the Navy]. *Morskoy sbornik*, No. 1, January 1982, pp. 20-24.
- "Doktrina voennaya" [Military doctrine]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 3. Moscow: Voenizdat, 1977, pp. 225-229.
- "XXII s"ezd Kommunisticheskoy partii Sovetskogo Soyuz: Rech' Marshala Sovetskogo Soyuz R.Ya. Malinovskogo" [Twenty-third Congress of the Communist Party of the Soviet Union: Speech by Marshal of the Soviet Union R.Ya. Malinovskiy] *Krasnaya zvezda*, 24 October 1961, pp. 3-4.
- Emel'yanov, L.A. "K voprosu o taktike flota i predmete ee issledovaniya" [Naval tactics and its subject of study]. *Morskoy sbornik*, No. 4, April 1963, pp. 23-28.
- Filonov, S. "Morskaya operatsiya" [Naval operation]. *Morskoy sbornik*, No. 10, October 1977, pp. 21-25.
- "Formy boevykh deystviy" [Forms of warfare]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 8. Moscow: Voenizdat, 1980, p. 305.
- Gontaev, A. "Flot v voyne: opyt i uroki" [Navies in war: experience and lessons]. *Morskoy sbornik*, No. 4, April 1975, pp. 104-109.
- Gordeev, I. "Nash zhurnal" [Our journal]. *Morskoy sbornik*, No. 3, March 1978, pp. 25-26.
- Gorshkov, S.G. "Resheniya XXII s"ezda KPSS i zadachi voennykh moryakov" [Decisions of the 22nd CPSU Congress and the tasks of seamen]. *Morskoy sbornik*, No. 1, January 1962, pp. 3-19.
- \_\_\_\_\_. "Razvitie sovetskogo voenno-morskogo iskusstva" [Development of the Soviet art of naval warfare]. *Morskoy sbornik*, No. 2, February 1967, pp. 9-21.
- \_\_\_\_\_. "Voennno-morskoe floty v voynakh i v mirnoe vremya" [Navies in war and peace]. *Morskoy sbornik*, No. 5, May 1972, pp. 12-24.

- \_\_\_\_\_. "Voenno-morskie floty v voynakh i v mirnoe vremya." *Morskoy sbornik*, No. 11, November 1972, pp. 24-34.
- \_\_\_\_\_. "Nekotorye voprosy razvitiya voenno-morskogo iskusstva" [Some issues of the development of the art of naval warfare]. *Morskoy sbornik*, No. 12, December 1974, pp. 24-32.
- \_\_\_\_\_. *Morskaya moshch' gosudarstva*. 1st ed. Moscow: Voenizdat, 1976.
- \_\_\_\_\_. *Morskaya moshch' gosudarstva*. 2nd rev. ed. Moscow: Voenizdat, 1979.
- Gulyaev, S.A. "Rol' aviatsii v boevykh deystviyakh na more v sovremennykh usloviyakh" [The role of aircraft in warfare at sea in modern conditions]. *Morskoy sbornik*, No. 6, June 1965, pp. 36-43.
- Iskanderov, M. "Razvitie boya" [Evolution of the engagement]. *Morskoy sbornik*, No. 5, 1980, pp. 28-32.
- Ivanov, B.N. "O predmete issledovaniya taktiki" [The subject of study of tactics]. *Morskoy sbornik*, No. 6, June 1963, pp. 27-30.
- "Kategorii voennoy nauki" [Categories of military science]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 4. Moscow: Voenizdat, 1977, pp. 121-122.
- Kharlamov, N.M. "Tendentsii razvitiya voenno-morskikh flotov" [Trends in the development of navies]. *Morskoy sbornik*, No. 1, January 1966, pp. 31-36.
- "Kharlamov Nikolay Mikhaylovich." *Bol'shaya Sovetskaya Entsiklopediya*. 3rd rev. ed., vol. 28. Moscow: Sovetskaya entsiklopediya, 1978, p. 201.
- Kolesnikov, Yu.V. "O nekotorykh kategoriyakh taktiki flota" [Some categories of naval tactics]. *Morskoy sbornik* No. 11, November 1963, pp. 1924.
- Kolosov, I.I. "Deystviya aviatsii po korablyam v more v usloviyakh radioprotivodeystviya" [Aircraft action against ships at sea in an electronic countermeasures environment]. *Morskoy sbornik*, No. 3, March 1962, pp. 37-43.
- Korotkov, I. "O razvitii sovetskoy voennoy teorii v poslevoennye gody" [Development of Soviet military theory in the postwar years]. *Voenno-istoricheskiy zhurnal*, No. 4, April 1964, pp. 39-50.
- Kostev, G. "Vzaimodeystvie--vazhneyshiy printsip ispol'zovaniya sil" [Combined action--a paramount principle of force employment]. *Morskoy sbornik*, No. 2, February 1974, pp. 28-33.
- \_\_\_\_\_. "Ob osnovakh teorii Voenno-Morskogo Flota" [Fundamentals of the theory of the Navy]. *Morskoy sbornik*, No. 11, November 1981, pp. 24-29.
- Kulikov, V.G., ed. *Akademiya General'nogo shtaba* [The General Staff Academy]. Moscow: Voenizdat, 1976.

- Lisyutin, V.S. "K voprosu o kategoriakh voenno-morskogo iskusstva v sovremennykh usloviyakh" [Categories of the art of naval warfare in modern conditions]. *Morskoy sbornik*, No. 3, March 1961, pp. 14-22.
- Lomov, N. "O sovetskoy voennoy doktrine" [Soviet military doctrine]. *Kommunist Vooruzhennykh Sil*, No. 10, May 1962, pp. 11-21.
- Makeev, B. "Nekotorye vzglyady na teoriyu vooruzheniya VMF" [Some views on the theory of Navy weapons development]. *Morskoy sbornik*, No. 4, April 1982, pp. 27-31.
- Mamchits, V.S. "Osnovnye osobennosti sovremennogo morskogo boya" [Basic features of the modern naval engagement]. *Morskoy sbornik*, No. 4, April 1977, pp. 23-27.
- "Massirovanie sil i sredstv" [Massing of forces and means]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 5. Moscow: Voenizdat, 1978, pp. 179-180.
- Molotkov, B.P. "Ob izmenenii form boevykh deystviy na more v svyazi s razvitiem sredstv vooruzhennoy bor'by" [Change in the forms of warfare at sea owing to the development of the means of warfare]. *Morskoy sbornik*, No. 3, March 1963, pp. 24-27.
- Morozov, K.V. *Korabel'nye sredstva protivovozdushnoy oborony* [Shipborne means of air defense]. Moscow: Voenizdat, 1960.
- Morskoy slovar'* [Maritime dictionary]. 2 vols. Moscow: Voenizdat, 1959.
- "O nekotorykh printsipakh voenno-morskogo iskusstva v sovremennykh usloviyakh" [Some principles of the art of naval warfare in modern conditions]. *Morskoy sbornik*, No. 10, October 1961, pp. 16-25.
- "Operativnoe iskusstvo" [Operational art]. *Sovetskaya Voennaya Entsiklopediya*, Vol. 6. Moscow: Voenizdat, 1978, pp. 53-57.
- Orel, A. "V gody voyny" [In the war years]. *Morskoy sbornik*, No. 1, January 1977, pp. 16-19.
- Panteleev, Yu.A. "Nekotorye voprosy deystviy flota v sovremennoy voyne" [Some issues of naval action in modern war]. *Morskoy sbornik*, No. 2, February 1966, pp. 27-34.
- "Panteleev Yuriy Aleksandrovich." *Sovetskaya Voennaya Entsiklopediya*. Vol. 6. Moscow: Voenizdat, 1978, pp. 206-207.
- Pavlovich, N.B. "Osnovnye faktory razvitiya voenno-morskogo iskusstva" [Basic factors of the development of the art of naval warfare]. *Voenno-istoricheskii zhurnal*, No. 12, December 1974, pp. 48-53.
- \_\_\_\_\_, ed. *Flot v pervoy mirovoy voyne* [Navies in the First World War]. 2 vols., Moscow: Voenizdat, 1964.
- Pavlovich, N.B., and Achkasov, V.I. *Sovetskoe voenno-morskoe iskusstvo v Velikoy Otechestvennoy voyne* [The Soviet art of naval warfare in the Great Patriotic War]. Moscow: Voenizdat, 1973.

- Petrov, B.F. "Taktika flota i predmet ee issledovaniya" [Naval tactics and its subject of study]. *Morskoy sbornik*, No. 7, July 1962, pp. 24-31.
- \_\_\_\_\_. "Soderzhanie i kharakter sovremennykh boevykh deystviy na more" [Content and character of modern warfare at sea]. *Morskoy sbornik*, No. 1, January 1965, pp. 7-15.
- "Printsipy voennogo iskusstva" [Principles of the military art]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 6. Moscow: Voenizdat, 1978, pp. 542-543.
- Pushkin, A. "Boevye deystviya amerikanskikh i yaponskikh podvodnykh lodok protiv avianostsev v period vtoroy mirovoy voyny" [American and Japanese submarine warfare against aircraft carriers during the World War II period]. *Morskoy sbornik*, No. 9, September 1979, pp. 11-26.
- Radzievskiy, A.I. "Morskaya moshch' gosudarstva" [Sea power of the state]. *Voennaya mysl'*, No. 7, July 1976, pp. 83-92, Confidential.
- "Soderzhanie i forma" [Content and form]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 7. Moscow: Voenizdat, 1979, pp. 425-426.
- Sokolovskiy, V.D., ed. *Voennaya strategiya* [Military strategy]. 3rd rev. ed. Moscow: Voenizdat, 1968.
- "Sposoby boevykh deystviy" [Methods of warfare]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 7. Moscow: Voenizdat, 1979, pp. 501-502.
- Spravochnik ofitsera* [Officer's handbook]. Moscow: Voenizdat, 1971.
- Stalbo, K.A. "O nekotorykh kategoriakh voenno-morskogo iskusstva v sovremennom ikh proyavleniya" [Some categories of the art of naval warfare in their modern manifestation]. *Morskoy sbornik*, No. 1, January 1961, pp. 17-25.
- \_\_\_\_\_. "Avianostsy vo vtoroy mirovoy voyne" [Aircraft carriers in World War II]. *Morskoy sbornik*, No. 1, January 1978, pp. 91-100.
- \_\_\_\_\_. "Avianostsy v poslevoenny period" [Aircraft carriers in the postwar period]. *Morskoy sbornik*, No. 6, June 1978, pp. 91-100.
- \_\_\_\_\_. "Nekotorye voprosy teorii razvitiya i ispol'zovaniya VMF" [Some issues of the theory of the development and employment of the Navy]. *Morskoy sbornik*, No. 4, April 1981, pp. 20-28.
- \_\_\_\_\_. "Nekotorye voprosy teorii razvitiya i ispol'zovaniya VMF." *Morskoy sbornik*, No. 5, May 1981, pp. 17-27.
- Sukhanov, A.N. "Vliyanie razvitiya tekhniki i oruzhiya na taktiku aviatsii pri deystviyakh po korablyam v more" [Impact of the development of weapons and technology on the tactics of air warfare against ships at sea]. *Morskoy sbornik*, No. 4, April 1961, pp. 31-37.



- Sukhodol'skiy, N.V. "O formakh i zakonomernostyakh boevykh deystviy na more" [Forms and patterns of warfare at sea]. *Morskoy sbornik*, No. 10, October 1962, pp. 19-25.
- Svetlov, A.G. "O vzaimodeystvii v morskoy boyu" [Combined action in the naval engagement]. *Morskoy sbornik*, No. 12, December 1962, pp. 18-25.
- Sysoev, V.S. "Ob izmenenii soderzhaniya nekotorykh ponyatiy voenno-morskogo iskusstva" [The changing content of some concepts of the art of naval warfare]. *Morskoy sbornik*, No. 4, April 1961, pp. 22-30.
- \_\_\_\_\_. "Kazvitie form vooruzhennoy bor'by na more" [Evolution of the forms of warfare at sea]. *Morskoy sbornik*, No. 11, November 1980, pp. 24-29.
- \_\_\_\_\_. "Teoriya upravleniya Voennno-Morskim Flotom" [The Navy's theory of command and control]. *Morskoy sbornik*, No. 3, March 1982, pp. 21-27.
- "Taktika voenno-morskogo flota" [Naval tactics]. *Bol'shaya Sovetskaya Entsiklopediya*. 2nd rev. ed., vol. 41. Moscow: Bol'shaya Sovetskaya Entsiklopediya, 1956, pp. 543-545.
- "Taktika voenno-morskogo flota." *Sovetskaya Voennaya Entsiklopediya*. Vol. 7. Moscow: Voenizdat, 1979, pp. 631-642.
- "Teoriya voenno-morskogo iskusstva i sovremennyy flot" [The theory of the art of naval warfare and the modern navy]. *Morskoy sbornik*, No. 2, February 1964, pp. 41-47.
- "Vnezapnost'" [Surprise]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 2. Moscow: Voenizdat, 1976, pp. 161-163.
- "Voennno-morskaya akademiya imeni Marshala Sovetskogo Soyuza A.A. Grechko" [Marshal of the Soviet Union A. A. Grechko Naval Academy]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 2. Moscow: Voenizdat, 1976, pp. 230-231.
- Voprosy taktiki v sovetskikh voennykh trudakh (1917-1940 gg.)* [Tactical issues in Soviet military works, 1917-1940]. Moscow: Voenizdat, 1970.
- V'yunenkov, N.P. "Sovetskoe voenno-morskoe iskusstvo nakanune Velikoy Otechestvennoy voyny" [The Soviet art of naval warfare on the eve of the Great Patriotic War]. *Morskoy sbornik*, No. 6, June 1971, pp. 29-34.
- \_\_\_\_\_. "O nekotorykh tendentsiyakh v razvitii morskoy taktiki" [Some trends in the development of naval tactics]. *Morskoy sbornik*, No. 10, October 1975, pp. 21-26.
- "Vzaimodeystvie" [Combined action]. *Sovetskaya Voennaya Entsiklopediya*. Vol. 2. Moscow: Voenizdat, 1976, pp. 123-125.
- Zakharov, S.E., ed. *Istoriya voenno-morskogo iskusstva* [History of the art of naval warfare]. Moscow: Voenizdat, 1969.

CNA PROFESSIONAL PAPERS - 1978 TO PRESENT\*

- PP 211  
Mizrahi, Maurice M., "On Approximating the Circular Coverage Function," 14 pp., Feb 1978, AD A054 429
- PP 212  
Mangel, Marc, "On Singular Characteristic Initial Value Problems with Unique Solution," 20 pp., Jun 1978, AD A058 535
- PP 213  
Mangel, Marc, "Fluctuations in Systems with Multiple Steady States. Application to Lanchester Equations," 12 pp., Feb 78 (Presented at the First Annual Workshop on the Information Linkage Between Applied Mathematics and Industry, Naval PG School, Feb 23-25, 1978), AD A071 472
- PP 214  
Weinland, Robert G., "A Somewhat Different View of The Optimal Naval Posture," 37 pp., Jun 1978 (Presented at the 1976 Convention of the American Political Science Association (APSA/IUS Panel on "Changing Strategic Requirements and Military Posture"), Chicago, Ill., September 2, 1976), AD A056 228
- PP 215  
Colle, Russell C., "Comments on: Principles of Information Retrieval by Manfred Kochen," 10 pp., Mar 78 (Published as a Letter to the Editor, Journal of Documentation, Vol. 31, No. 4, pages 298-301), December 1975), AD A054 426
- PP 216  
Colle, Russell C., "Lotka's Frequency Distribution of Scientific Productivity," 18 pp., Feb 1978 (Published in the Journal of the American Society for Information Science, Vol. 28, No. 6, pp. 366-370, November 1977), AD A054 425
- PP 217  
Colle, Russell C., "Bibliometric Studies of Scientific Productivity," 17 pp., Mar 78 (Presented at the Annual meeting of the American Society for Information Science held in San Francisco, California, October 1976), AD A054 442
- PP 218 - Classified
- PP 219  
Huntzinger, R. LaVar, "Market Analysis with Rational Expectations: Theory and Estimation," 60 pp., Apr 78, AD A054 422
- PP 220  
Maurer, Donald E., "Diagonalization by Group Matrices," 26 pp., Apr 78, AD A054 443
- PP 221  
Weinland, Robert G., "Superpower Naval Diplomacy in the October 1973 Arab-Israeli War," 76 pp., Jun 1978 (Published in Seapower in the Mediterranean: Political Utility and Military Constraints, The Washington Papers No. 61, Beverly Hills and London: Sage Publications, 1979) AD A055 564
- PP 222  
Mizrahi, Maurice M., "Correspondence Rules and Path Integrals," 30 pp., Jun 1978 (Invited paper presented at the CNRS meeting on "Mathematical Problems in Feynman's Path Integrals," Marseille, France, May 22-26, 1978) (Published in Springer Verlag Lecture Notes in Physics, 106, (1979), 234-253) AD A055 536
- PP 223  
Mangel, Marc, "Stochastic Mechanics of Molecule-Molecule Reactions," 21 pp., Jun 1978, AD A056 227
- PP 224  
Mangel, Marc, "Aggregation, Bifurcation, and Extinction in Exploited Animal Populations," 48 pp., Mar 1978, AD A058 536  
\*Portions of this work were started at the Institute of Applied Mathematics and Statistics, University of British Columbia, Vancouver, B.C., Canada
- PP 225  
Mangel, Marc, "Oscillations, Fluctuations, and the Hopf Bifurcation," 43 pp., Jun 1978, AD A058 537  
\*Portions of this work were completed at the Institute of Applied Mathematics and Statistics, University of British Columbia, Vancouver, Canada.
- PP 226  
Ralston, J. M. and J. W. Mann,\* "Temperature and Current Dependence of Degradation in Red-Emitting GaP LEDs," 34 pp., Jun 1978 (Published in Journal of Applied Physics, 50, 3630, May 1979) AD A058 538  
\*Bell Telephone Laboratories, Inc.
- PP 227  
Mangel, Marc, "Uniform Treatment of Fluctuations at Critical Points," 50 pp., May 1978, AD A058 539
- PP 228  
Mangel, Marc, "Relaxation at Critical Points: Deterministic and Stochastic Theory," 54 pp., Jun 1978, AD A058 540
- PP 229  
Mangel, Marc, "Diffusion Theory of Reaction Rates, I: Formulation and Einstein-Smoluchowski Approximation," 50 pp., Jan 1978, AD A058 541
- PP 230  
Mangel, Marc, "Diffusion Theory of Reaction Rates, II Ornstein-Uhlenbeck Approximation," 34 pp., Feb 1978, AD A058 542
- PP 231  
Wilson, Desmond P., Jr., "Naval Projection Forces: The Case for a Responsive MAF," Aug 1978, AD A054 543
- PP 232  
Jacobson, Louis, "Can Policy Changes Be Made Acceptable to Labor?" Aug 1978 (Submitted for publication in Industrial and Labor Relations Review), AD A061 528

\*CNA Professional Papers with an AD number may be obtained from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151. Other papers are available from the Management Information Office, Center for Naval Analyses, 2000 North Beauregard Street, Alexandria, Virginia 22311. An Index of Selected Publications is also available on request. The Index includes a listing of Professional Papers; with abstracts; issued from 1969 to June 1981.



- PP 233  
Jacobson, Louis, "An Alternative Explanation of the Cyclical Pattern of Quits," 23 pp., Sep 1978
- PP 234 - Revised  
Jondrow, James and Levy, Robert A., "Does Federal Expenditure Displace State and Local Expenditure: The Case of Construction Grants," 25 pp., Oct 1979, AD A061 529
- PP 235  
Mizrahi, Maurice M., "The Semiclassical Expansion of the Anharmonic-Oscillator Propagator," 41 pp., Oct 1978 (Published in Journal of Mathematical Physics 20 (1979) pp. 844-855), AD A061 538
- PP 237  
Maurer, Donald, "A Matrix Criterion for Normal Integral Bases," 10 pp., Jan 1979 (Published in the Illinois Journal of Mathematics, Vol. 22 (1978), pp. 672-681)
- PP 238  
Utgoff, Kathleen Classen, "Unemployment Insurance and The Employment Rate," 20 pp., Oct 1978 (Presented at the Conference on Economic Indicators and Performance: The Current Dilemma Facing Government and Business Leaders, presented by Indiana University Graduate School of Business). AD A061 527
- PP 239  
Trost, R. P. and Warner, J. T., "The Effects of Military Occupational Training on Civilian Earnings: An Income Selectivity Approach," 38 pp., Nov 1979k, AD A077 831
- PP 240  
Powers, Bruce, "Goals of the Center for Naval Analyses," 13 pp., Dec 1978, AD A063 759
- PP 241  
Mangel, Marc, "Fluctuations at Chemical Instabilities," 24 pp., Dec 1978 (Published in Journal of Chemical Physics, Vol. 69, No. 8, Oct 15, 1978). AD A063 787
- PP 242  
Simpson, William R., "The Analysis of Dynamically Interactive Systems (Air Combat by the Numbers)," 160 pp., Dec 1978, AD A063 760
- PP 243  
Simpson, William R., "A Probabilistic Formulation of Murphy Dynamics as Applied to the Analysis of Operational Research Problems," 18 pp., Dec 1978, AD A063 761
- PP 244  
Sherman, Allan and Horowitz, Stanley A., "Maintenance Costs of Complex Equipment," 20 pp., Dec 1978 (Published By The American Society of Naval Engineers, Naval Engineers Journal, Vol. 91, No. 6, Dec 1979) AD A071 473
- PP 245  
Simpson, William R., "The Accelerometer Methods of Obtaining Aircraft Performance from Flight Test Data (Dynamic Performance Testing)," 403 pp., Jun 1979, AD A075 226
- PP 246  
Brechling, Frank, "Layoffs and Unemployment Insurance," 35 pp., Feb 1979 (Presented at the Nber Conference on "Low Income Labor Markets," Chicago, Jun 1978), AD A096 629
- PP 248  
Thomas, James A., Jr., "The Transport Properties of Dilute Gases in Applied Fields," 183 pp., Mar 1979, AD A096 464
- PP 249  
Glasser, Kenneth S., "A Secretary Problem with a Random Number of Choices," 23 pp., Mar 1979
- PP 250  
Mangel, Marc, "Modeling Fluctuations in Macroscopic Systems," 26 pp., Jun 1979
- PP 251  
Trost, Robert P., "The Estimation and Interpretation of Several Selectivity Models," 37 pp., Jun 1979, AD A075 941
- PP 252  
Nunn, Walter R., "Position Finding with Prior Knowledge of Covariance Parameters," 5 pp., Jun 1979 (Published in IEEE Transactions on Aerospace & Electronic Systems, Vol. AES-15, No. 3, Mar 1979)
- PP 253  
Glasser, Kenneth S., "The d-Choice Secretary Problem," 32 pp., Jun 1979, AD A075 225
- PP 254  
Mangel, Marc and Quanbeck, David B., "Integration of a Bivariate Normal Over an Offset Circle," 14 pp., Jun 1979, AD A096 471
- PP 255 - Classified, AD B051 441L
- PP 256  
Maurer, Donald E., "Using Personnel Distribution Models," 27 pp., Feb 1980, AD A082 218
- PP 257  
Thaler, R., "Discounting and Fiscal Constraints: Why Discounting Is Always Right," 10 pp., Aug 1979, AD A075 224
- PP 258  
Mangel, Marc S. and Thomas, James A., Jr., "Analytical Methods in Search Theory," 86 pp., Nov 1979, AD A077 832
- PP 259  
Glass, David V.; Hsu, Ih-Ching; Nunn, Walter R., and Perlin, David A., "A Class of Commutative Markov Matrices," 17 pp., Nov 1979, AD A077 833
- PP 260  
Mangel, Marc S. and Cope, Davis K., "Detection Rate and Sweep Width in Visual Search," 14 pp., Nov 1979, AD A077 834
- PP 261  
Vila, Carlos L.; Zvijac, David J. and Ross, John, "Frank-Condon Theory of Chemical Dynamics. VI. Angular Distributions of Reaction Products," 14 pp., Nov 1979 (Reprinted from Journal Chemical Phys. 70(12), 15 Jun 1979), AD A076 287
- PP 262  
Petersen, Charles C., "Third World Military Elites in Soviet Perspective," 50 pp., Nov 1979, AD A077 835
- PP 263  
Robinson, Kathy I., "Using Commercial Tankers and Container-ships for Navy Underway Replenishment," 25 pp., Nov 1979, AD A077 836

- PP 264  
Weinland, Robert G., "The U.S. Navy in the Pacific: Past, Present, and Glimpses of the Future," 31 pp., Nov 1979 (Delivered at the International Symposium on the Sea, sponsored by the International Institute for Strategic Studies, The Brookings Institution and the Yomiuri Shimbun, Tokyo, 16-20 Oct 1978) AD A066 837
- PP 265  
Weinland, Robert G., "War and Peace in the North: Some Political Implications of the Changing Military Situation in Northern Europe," 18 pp., Nov 1979 (Prepared for presentation to the Conference of the Nordic Balance in Perspective: The Changing Military and Political Situation, Center for Strategic and International Studies, Georgetown University, Jun 15-16, 1978) AD A077 838
- PP 266  
Utgoff, Kathy Classen, and Brechling, Frank, "Taxes and Inflation," 25 pp., Nov 1979, AD A081 194
- PP 267  
Trost, Robert P., and Vogel, Robert C., "The Response of State Government Receipts to Economic Fluctuations and the Allocation of Counter-Cyclical Revenue Sharing Grants," 12 pp., Dec 1979 (Reprinted from the Review of Economics and Statistics, Vol. LXI, No. 3, August 1979)
- PP 268  
Thomason, James S., "Seaport Dependence and Inter-State Cooperation: The Case of Sub-Saharan Africa," 141 pp., Jan 1980, AD A081 193
- PP 269  
Weiss, Kenneth G., "The Soviet Involvement in the Ogaden War," 42 pp., Jan 1980 (Presented at the Southern Conference on Slavic Studies in October, 1979), AD A082 219
- PP 270  
Remnek, Richard, "Soviet Policy in the Horn of Africa: The Decision to Intervene," 52 pp., Jan 1980 (To be published in "The Soviet Union in the Third World: Success or Failure," ed. by Robert H. Donaldson, Westview Press, Boulder, Co., Summer 1980), AD A081 195
- PP 271  
McConnell, James, "Soviet and American Strategic Doctrines: One More Time," 43 pp., Jan 1980, AD A081 192
- PP 272  
Weiss, Kenneth G., "The Azores in Diplomacy and Strategy, 1940-1945," 46 pp., Mar 1980, AD A085 094
- PP 273  
Nakada, Michael K., "Labor Supply of Wives with Husbands Employed Either Full Time or Part Time," 39 pp., Mar 1980, AD A082 220
- PP 274  
Nunn, Walter R., "A Result in the Theory of Spiral Search," 9 pp., Mar 1980
- PP 275  
Goldberg, Lawrence, "Recruiters Advertising and Navy Enlistments," 34 pp., Mar 1980, AD A082 221
- PP 276  
Goldberg, Lawrence, "Delaying an Overhaul and Ship's Equipment," 40 pp., May 1980, AD A085 095
- PP 277  
Mangel, Marc, "Small Fluctuations in Systems with Multiple Limit Cycles," 19 pp., Mar 1980 (Published in SIAM J. Appl. Math., Vol. 38, No. 1, Feb 1980) AD A086 229
- PP 278  
Mizrahi, Maurice, "A Targeting Problem: Exact vs. Expected-Value Approaches," 23 pp., Apr 1980, AD A085 096
- PP 279  
Wait, Stephen M., "Causal Inferences and the Use of Force: A Critique of Force Without War," 50 pp., May 1980, AD A085 097
- PP 280  
Goldberg, Lawrence, "Estimation of the Effects of A Ship's Steaming on the Failure Rate of Its Equipment: An Application of Econometric Analysis," 25 pp., Apr 1980, AD A085 098
- PP 281  
Mizrahi, Maurice M., "Comment on 'Discretization Problems of Functional Integrals in Phase Space'," 2 pp., May 1980, published in "Physical Review D", Vol. 22 (1980), AD A094 994
- PP 283  
Dismukes, Bradford, "Expected Demand for the U.S. Navy to Serve as An Instrument of U.S. Foreign Policy: Thinking About Political and Military Environmental Factors," 30 pp., Apr 1980, AD A085 099
- PP 284  
J. Kellison,\* W. Nunn, and U. Sumita,\*\* "The Laguerre Transform," 119 pp., May 1980, AD A085 100  
\*The Graduate School of Management, University of Rochester and the Center for Naval Analyses  
\*\*The Graduate School of Management, University of Rochester
- PP 285  
Remnek, Richard B., "Superpower Security Interests in the Indian Ocean Area," 26 pp., Jun 1980, AD A087 113
- PP 286  
Mizrahi, Maurice M., "On the MKB Approximation to the Propagator for Arbitrary Hamiltonians," 25 pp., Aug 1980 (Published in Journal of Math. Phys., 22(1) Jan 1981), AD A091 307
- PP 287  
Cope, Davis, "Limit Cycle Solutions of Reaction-Diffusion Equations," 35 pp., Jun 1980, AD A087 114
- PP 288  
Golmen, Walter, "Don't Let Your Slides Flip You: A Painless Guide to Visuals That Really Aid," 28 pp., (revised Aug 1982), AD A092 732
- PP 289  
Robinson, Jack, "Adequate Classification Guidance - A Solution and a Problem," 7 pp., Aug 1980, AD A091 212
- PP 290  
Watson, Gregory H., "Evaluation of Computer Software in an Operational Environment," 17 pp., Aug 1980, AD A091 213
- PP 291  
Maddala, G. S.\* and Trost, R. P., "Some Extensions of the Nerlove Press Model," 17 pp., Oct 1980, AD A091 946  
\*University of Florida

- PP 292  
Thomes, James A., Jr., "The Transport Properties of Binary Gas Mixtures in Applied Magnetic Fields," 10 pp., Sept 1980 (Published in Journal of Chemical Physics 72(10), 15 May 1980)
- PP 293  
Thomes, James A., Jr., "Evaluation of Kinetic Theory Collision Integrals Using the Generalized Phase Shift Approach," 12 pp., Sept 1980 (Printed in Journal of Chemical Physics 72(10), 15 May 1980)
- PP 294  
Roberts, Stephen S., "French Naval Policy Outside of Europe," 30 pp., Sept 1980 (Presented at the Conference of the Section on Military Studies, International Studies Association Kluwer Island, S.C.), AD A091 306
- PP 295  
Roberts, Stephen S., "An Indicator of Informal Empire: Patterns of U.S. Navy Cruising on Overseas Stations, 1869-1897," 40 pp., Sept 1980 (Presented at Fourth Naval History Symposium, US Naval Academy, 26 October 1979, AD A091 316)
- PP 296  
Dismukes, Bradford and Petersen, Charles C., "Maritime Factors Affecting Iberian Security," (Factores Maritimos Que Afectan La Seguridad Ibeica) 14 pp., Oct 1980, AD A092 733
- PP 297 - Classified
- PP 298  
Mizrahi, Maurice M., "A Markov Approach to Large Missile Attacks," 31 pp., Jan 1981, AD A096 159
- PP 299  
Jondrow, James M. and Levy, Robert A., "Wage Leadership in Construction, 19 pp., Jan 1981, AD A094 797
- PP 300  
Jondrow, James and Schmidt, Peter,\* "On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function Model," 11 pp., Jan 1981, AD A096 160  
\*Michigan State University
- PP 301  
Jondrow, James M.; Levy, Robert A. and Hughes, Claire, "Technical Change and Employment in Steel, Autos, Aluminum, and Iron Ore, 17 pp., Mar 1981, AD A099 394
- PP 302  
Jondrow, James M. and Levy, Robert A., "The Effect of Imports on Employment Under Rational Expectations," 19 pp., Apr 1981, AD A099 392
- PP 303  
Thomson, James, "The Rarest Commodity in the Coming Resource Wars," 3 pp., Aug 1981 (Published in the Washington Star, April 13, 1981)
- PP 304  
Duffy, Michael K.; Greenwood, Michael J.\* and McDowell, John M.,\*\* "A Cross-Sectional Model of Annual Interregional Migration and Employment Growth: Intertemporal Evidence of Structural Change, 1958-1975," 31 pp., Apr 1981, AD A099 393  
\*University of Colorado  
\*\*Arizona State University
- PP 305  
Nunn, Laura H., "An Introduction to the Literature of Search Theory," 32 pp., Jun 1981
- PP 306  
Anger, Thomas E., "What Good Are Warfare Models?" 7 pp., May 1981
- PP 307  
Thomson, James, "Dependence, Risk, and Vulnerability," 43 pp., Jun 1981
- PP 308  
Mizrahi, M.M., "Correspondence Rules and Path Integrals," Jul 1981. Published in "Nuovo Cimento B", Vol. 61 (1981)
- PP 309  
Weinland, Robert G., "An (The?) Explanation of the Soviet Invasion of Afghanistan," 44 pp., May 1981
- PP 310  
Stanford, Janette M. and Tai Te Wu,\* "A Predictive Method for Determining Possible Three-dimensional Foldings of Immunoglobulin Backbones Around Antibody Combining Sites," 19 pp., Jun 1981 (Published in J. theor. Biol. (1981) 88, 421-439  
\*Northwestern University, Evanston, IL
- PP 311  
Bowes, Marianne, Brechling, Frank P. R., and Utgoff, Kathleen P. Classen, "An Evaluation of UI Funds," 13 pp., May 1981 (Published in National Commission on Unemployment Compensation's Unemployment Compensation: Studies and Research, Volume 2, July 1980)
- PP 312  
Jondrow, James; Bowes, Marianne and Levy, Robert, "The Optimum Speed Limit," 23 pp., May 1981
- PP 313  
Roberts, Stephen S., "The U.S. Navy in the 1980s," 36 pp., Jul 1981
- PP 314  
Jehn, Christopher; Horowitz, Stanley A. and Lockman, Robert F., "Examining the Draft Debate," 20 pp., Jul 1981
- PP 315  
Buck, Ralph V., Capt., "Le Catastrophe by any other name...", 4 pp., Jul 1981
- PP 316  
Roberts, Stephen S., "Western European and NATO Navies, 1980," 20 pp., Aug 1981
- PP 317  
Roberts, Stephen S., "Superpower Naval Crisis Management in the Mediterranean," 35 pp., Aug 1981
- PP 318  
Vega, Milan N., "Yugoslavia and the Soviet Policy of Force in the Mediterranean Since 1961," 187 pp., Aug 1981
- PP 319  
Smith, Michael W., "Anti-air Warfare Defense of Ships at Sea," 46 pp., Sep 1981 (This talk was delivered at the Naval Warfare System and Technology Conference of the American Institute of Aeronautics and Astronautics in Washington on December 12, 1980; in Boston on January 20, 1981; and in Los Angeles on June 12, 1981.)

- PP 320  
Trost, R. P.; Lurie, Philip and Berger, Edward, "A Note on Estimating Continuous Time Decision Models," 15 pp., Sep 1981
- PP 321  
Duffy, Michael K. and Ladman, Jerry R.,\* "The Simultaneous Determination of Income and Employment in United States--Mexico Border Region Economies," 34 pp., Sep 1981  
\*Associate Professor of Economics, Arizona State University, Tempe, AZ.
- PP 322  
Warner, John T., "Issues in Navy Manpower Research and Policy: An Economist's Perspective," 66 pp., Dec 1981
- PP 323  
Bomse, Frederick M., "Generation of Correlated Log-Normal Sequences for the Simulation of Clutter Echoes," 33 pp., Dec 1981
- PP 324  
Horowitz, Stanley A., "Quantifying Seapower Readiness," 6 pp., Dec 1981 (Published in Defense Management Journal, Vol. 18, No. 2)
- PP 326  
Roberts, Stephen S., "Western European and NATO Navies, 1981," 27 pp., Jul 1982
- PP 327  
Hammon, Colin, Capt., USN and Graham, David R., Dr., "Estimation and Analysis of Navy Shipbuilding Program Disruption Costs," 12 pp., Mar 1980
- PP 328  
Weinland, Robert G., "Northern Waters: Their Strategic Significance," 27 pp., Dec 1980
- PP 329  
Mangel, Marc, "Applied Mathematicians And Naval Operators," 40 pp., Mar 1982 (Revised)
- PP 330  
Lockman, Robert F., "Alternative Approaches to Attrition Management," 30 pp., Jan 1982
- PP 331  
Roberts, Stephen S., "The Turkish Straits and the Soviet Navy in the Mediterranean," 15 pp., Mar 1982 (Published in Navy International)
- PP 332  
Jehn, Christopher, "The RDF and Amphibious Warfare," 36 pp., Mar 1982
- PP 333  
Lee, Lung-Fel and Trost, Robert P., "Estimation of Some Limited Dependent Variable Models with Application to Housing Demand," 26 pp., Jan 1982 (Published in Journal of Econometrics 8 (1978) 357-382)
- PP 334  
Kenny, Lawrence W., Lee, Lung-Fel, Maddala, G. S., and Trost R. P., "Returns to College Education: An Investigation of Self-Selection Bias Based on the Project Talent Data," 15 pp., Jan 1982. (Published in International Economic Review, Vol. 20, No. 3, October 1979)
- PP 335  
Lee, Lung-Fel, G.S. Maddala, and R. P. Trost, "Asymptotic Covariance Matrices of Two-Stage Probit and Two-Stage Tobit Methods for Simultaneous Equations Models with Selectivity," 13 pp., Jan 1982. (Published in Econometrica, Vol. 48, No. 2 (March, 1980))
- PP 336  
O'Neill, Thomas, "Mobility Fuels for the Navy," 13 pp., Jan 1982. (Accepted for publication in Naval Institute Proceedings)
- PP 337  
Warner, John T. and Goldberg, Matthew S., "The Influence of Non-Fecundary Factors on Labor Supply," 23 pp., Dec 1981
- PP 339  
Wilson, Desmond P., "The Persian Gulf and the National Interest," 11 pp., Feb 1982
- PP 340  
Lurie, Philip, Trost, R. P., and Berger, Edward, "A Method for Analyzing Multiple Spell Duration Data," 34 pp., Feb 1982
- PP 341  
Trost, Robert P. and Vogel, Robert C., "Prediction with Pooled Cross-Section and Time-Series Data: Two Case Studies," 6 pp., Feb 1982
- PP 342  
Lee, Lung-Fel, Maddala, G. S., and Trost, R. P., "Testing for Structural Change by D-Methods in Switching Simultaneous Equations Models," 5 pp., Feb 1982
- PP 343  
Goldberg, Matthew S., "Projecting the Navy Enlisted Force Level," 9 pp., Feb 1982
- PP 344  
Fletcher, Jean, W., "Navy Quality of Life and Reenlistment," 13 pp., Nov 1981
- PP 345  
Utgoff, Kathy and Thaler, Dick, "The Economics of Multi Year Contracting," 47 pp., Mar 1982. (Presented at the 1982 Annual Meeting of the Public Choice Society, San Antonio, Texas, March 5-7, 1982)
- PP 346  
Rostker, Bernard, "Selective Service and the All-Volunteer Force," 23 pp., Mar 1982
- PP 347  
McConnell, James, M., "A Possible Counterforce Role for the Typhoon," 24 pp., Mar 1982
- PP 348  
Jondrow, James, Trost, Robert, "An Empirical Study of Production Inefficiency in the Presence of Errors-In-The-Variables," 14 pp., Feb 1982
- PP 349  
W. H. Breckenridge, O. Kim Malmn, "Collisional Intra-multiplet Relaxation of  $Cd(5s5p^3P_{0,1,2})$  by Alkane Hydrocarbons," 7 pp., Jul 1981. (Published in Journal of Chemical Physics, 76(4), 15 Feb 1982)

- PP 350  
Levin, Marc, "A Method for Increasing the Firepower of Virginia Class Cruisers," 10 pp., Apr 1982. (To be published in U.S. Naval Institute Proceedings)
- PP 351  
Coutre, S. E.; Stanford, J. M.; Hovis, J. G.; Stevens, P. W.; Wu, T. T., "Possible Three-Dimensional Backbone Folding Around Antibody Combining Site of Immunoglobulin MOFC 167," 18 pp., Apr 1982. (Published in Journal of Theoretical Biology)
- PP 352  
Barfoot, C. Bernard, "Aggregation of Conditional Absorbing Markov Chains," 7 pp., June 1982 (Presented to the Sixth European Meeting on Cybernetics and Systems Research, held at the University of Vienna, Apr 1982.)
- PP 353  
Barfoot, C. Bernard, "Some Mathematical Methods for Modeling the Performance of a Distributed Data Base System," 18 pp., June 1982. (Presented to the International Working Conference on Model Realism, held at Bad Honnek, West Germany, Apr 1982.)
- PP 354  
Hall, John V., "Why the Short-War Scenario is Wrong for Naval Planning," 6 pp., Jun 1982.
- PP 356  
Cylke, Steven; Goldberg, Matthew S.; Hogan, Paul; Mairs, Lee; "Estimation of the Personal Discount Rate: Evidence from Military Reenlistment Decisions," 19 pp., Apr 1982.
- PP 357  
Goldberg, Matthew S., "Discrimination, Nepotism, and Long-Run Wage Differentials," 13 pp., Sep 1982. (Published in Quarterly Journal of Economics, May 1982.)
- PP 358  
Akst, George, "Evaluating Tactical Command And Control Systems--A Three-Tiered Approach," 12 pp., Sep 1982.
- PP 361  
Quanbeck, David B., "Methods for Generating Aircraft Trajectories," 51 pp., Sep 1982.
- PP 362  
Horowitz, Stanley A., "Is the Military Budget Out of Balance?," 10 pp., Sep 1982.
- PP 363  
Marcus, A. J., "Personnel Substitution and Navy Aviation Readiness," 35 pp., Oct 1982.
- PP 366  
Sprulli, Nancy L., Gastwirth, Joseph L., "On the Estimation of the Correlation Coefficient From Grouped Data," 9 pp., Oct 1982. (Published in the Journal of the American Statistical Association, Sep 1982, Vol. 77, No. 379, Theory and Methods Section.)
- PP 367  
Petersen, Charles C., "Soviet Tactics For Warfare At Sea: Two Decades of Upheaval," 58 pp., Nov 1982.